

ADAPTING PERFORMANCE ANALYSIS FOR
TRAINING TO VETERINARY EDUCATION

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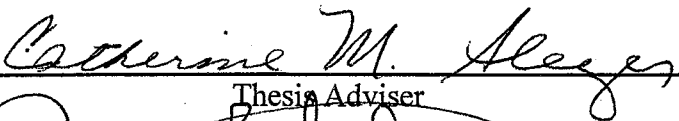
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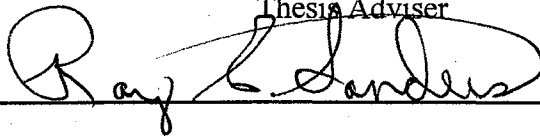
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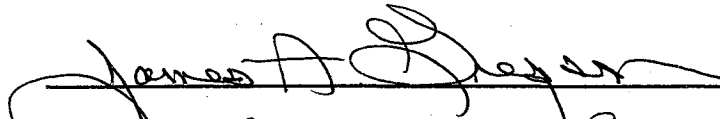
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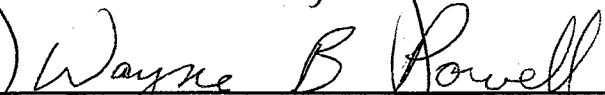


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CHAPTER I

INTRODUCTION

Veterinary medicine education in North America is currently undergoing a period of self-examination. Many academic articles have challenged the classic pathology curriculum, and some professional publications have questioned the adequacy of current Doctor of Veterinary Medicine (DVM) curricula (Pritchard, 1987; Stone, Shugars, Baden, & O'Neil, 1992; Turnwald, Bull, & Seeler, 1993; Wyman & Hudson, 1989).

Background to the Problem

Increasingly, knowledge that is needed on the job differs from that which is learned in the schools (Talbot, 1989). In 1988, the Pew National Veterinary Education Program published Future Directions for Veterinary Medicine, a seminal analysis of North America's veterinary education institutions. The Pew Report argued that fundamental changes must occur in the curricula of veterinary medicine to benefit practitioners whose careers mostly will lie in the twenty-first century (Pritchard, 1988). Professional veterinary publications also warned that North America's 31 training institutions were "not truly aware of how out of step veterinary education has become in regard to the needs of professionals" (Pritchard, 1989, p. 866) with respect to the needs of practitioners and the changing society in which they serve. Based on the Pew Report, some veterinary educators agreed with Ward (1989, p. 43) that veterinary medicine curriculum had become "unbalanced." One concern was that too much emphasis had been placed upon memorizing facts and too little time allocated to problem solving, enhancing motor skills, and developing professional attitudes (Pritchard, 1987; Ward & Bushby, 1987). Ward (1989) stated that the most frequent criticisms of new graduates by employers were, "They take too much time, they order too many tests, and they don't

have any sense about the economics of practice" (p. 43). Myers and Taylor (1996) reported that employers described recent graduates as "lacking problem solving and integrative skills typically impractical, without insight into practice management and business principles" (p. 8).

Specific changes have been suggested by veterinary educators. For example, Ward (1989) advocated that veterinary schools increase the amount of clinical practice that students receive. Talbot (1988) advised adopting an apprenticeship approach. Bushby (1985) and MacNeil, Algermissen, and Neill (1985) proposed solving the deficiency by teaching information retrieval skills in place of fragmented knowledge. Paul and Wilson (1993) urged the adoption of problem-centered learning opportunities. Turnwald, Bull, and Seeler (1993) and Stone et al. (1992) wrote that veterinary schools must teach lifelong learning if graduates are to remain capable while methodologies change.

In addition to core biological and clinical knowledge, Frazier & Howell (1991), Pelzer & Leysen (1991), Pritchard (1988), and Ward (1989) have suggested that today's veterinary education should include elements of business management, information systems, team work, diversity training, interpersonal communication skills, public health, animal nutrition and husbandry, and original research. However, the current curricula can not achieve these objectives within the limit of four years of lectures and laboratories (Pollock, 1985; Resnick, 1987; Ward, 1989).

The challenge of relating veterinary medical instruction to needs after graduation is on-going (Turnwald, Bull, & Seeler, 1993), and pressure to prove the value of a professional education program is greater than ever before (Phillips, 1991). To ensure that the context of curricula is relevant and that instruction is effective, it is important to provide educators with feedback about graduates' abilities. If professional education does not beget the capabilities that employers require then education resources are better invested in other enterprises (Carnavale & Schultz, 1990; Fitz-Enz, 1988; Gordon, 1991;

Kaufman, 1985). Tyler (1949) recognized this issue and proposed that education programs periodically undergo evaluation. Tyler (cited in Giroux, Penna, & Pinar, 1981) defined evaluation as "the process of determining to what extent educational objectives are actually being realized by the curriculum and instruction" (p. 63). Without periodic evaluations, educators may be unaware that a curriculum is irrelevant to the needs of the external environment.

Education product evaluation is often used to appraise an institution's curriculum based on graduates' performance after schooling. Finch and Crunkilton (1993) believed that the product of any curriculum is the student, and they state that educational product evaluation ought to look at former students to determine the quality of a curriculum. In a specific example, Stone et al. (1992) argued that practitioners should help the veterinary colleges adapt to changes in the profession by offering constructive feedback. Based on that argument, polling veterinary graduates and their employers can provide useful information for evaluating curriculum outcomes and identifying needs.

Needs assessment is a tool that educators can employ in the initial stages of an instructional review or a curriculum product evaluation to gather the kinds of information needed to justify changes (Bowman, 1987; Geber, 1990; Leeds, 1993; Smith & Roth, 1990). It is also a technique educational institutions use to plan programs, set priorities, and solicit solutions to performance problems (Pinola, 1984). Needs assessment can also be used to monitor trends within a profession, and to encourage participation among practicing alumni (Kaufman & Stone, 1983). Smith and Roth (1990) recommended that educators use needs assessment to make "informed decisions in planning training programs, courses, and conferences that will meet the perceived needs of students, instructors, and the community" (p. 23). A particular use of needs assessment at all education levels is to modify curricula (Witkin, 1984).

However, the needs assessment literature contains few empirical studies that examine the needs assessment process (Lewis & Bjorquist, 1992; Ng, 1988). One

model that has been empirically studied and validated is the Performance Analysis for Training (PAT) model (Sleezer, 1990, 1991). The PAT model has been applied to cases such as banking, industrial processing, and manufacturing (see Sleezer 1991, 1995, 1996). To test the PAT model, Sleezer relied on a deductive approach using qualitative data with case study methodology. The case study is the preferred methodology for investigating problems that cannot be manipulated (Yin, 1989).

Sleezer (1991) noted that additional research is needed to compare the PAT model with other needs assessment models, within different contexts, and "with a variety of organizations, decision makers, and analysts" (p. 371). Sleezer further noted that repeated testing would extend the model's effectiveness. Yin (1989) pointed out that when case study findings are generalized to a theory many cases may be needed to validate the theory.

Statement of the Problem.

There was a need by the College to ascertain the extent to which the curriculum prepared graduates to practice veterinary medicine. Although the PAT model had been used for needs assessment in business, it had not been tested in an education setting. A second, associated problem addressed in this study was that the original PAT model did not consider the influence of the customer on the process and result of the needs assessment.

Purpose of the Research

This research had the broad purpose of developing deeper understanding of a specific needs assessment model, PAT, by applying it in a different organization setting and by a different analyst. This study focused on the model's fundamental premise: The characteristics of an organization, its management, and the analyst influence the process of uncovering needs and shapes decision makers' choices of solutions (Sleezer, 1990). This study involved applying the PAT model in a college of veterinary medicine at a Midwestern university and documenting the process and results. The primary service of

the College was preparing students for professional practice through teaching the DVM degree. In business and industry, where the PAT model had been tested, training was an auxiliary practice. Additionally, this study involved modifying the PAT model to add a new element, the customer. The customer element was needed to reflect the external influence by clientele upon an organization's process or service needs (Rummler, 1992).

Research Questions

The study answered the following questions about needs assessment:

1. How useful was the modified PAT model for determining deficiencies in a professional curriculum offered at one institution of higher education? Answering this question required addressing two related questions: (a) How useful was the inclusion of customers in the needs assessment, and (b) how useful were the needs assessment findings for making changes in the veterinary curriculum?

2. To what extent were the results of the needs assessment influenced by the characteristics of the model's four elements (i.e., the organization, the decision makers, the analyst, and the customers)? A related question was, to what extent did using the modified PAT model involve the institution's decision makers in the needs assessment process?

The answers to these questions were expected to assist educators of various professions in their curriculum planning, design, instruction, and evaluation efforts by providing them with information about a needs assessment model, PAT, that has been used to assist in one professional curriculum evaluation at an institution of higher education. The answers also were expected to be used to improve the PAT model and to extend the body of knowledge in needs assessment theory.

Conditions of the Research

The following assumption and limitations temper the research:

Assumption

One assumption was operating throughout the design and execution of the research: The three Phases of the PAT model need not all be processed if one or two are not applicable to an organization's problem or opportunity. Only Phase One, Organization Analysis, was applicable to this case study. The College's curriculum review did not require the Work Behavior Analysis (Phase Two) nor an the Individual Capabilities Analysis (Phase Three).

Limitations

There were two meaningful limitations to this study:

1. The study findings cannot be generalized to other education settings nor can another business-tested needs assessment model be assumed appropriate for a veterinary curriculum review.
2. The study considers only one example of many needs assessment models. Additional research needs to be done comparing the PAT model to other needs determination approaches within an education setting.

Definition of Terms

The vocabulary of this research spans two different fields, human resources development and veterinary medicine, and within these fields there are variances in the terminology. The following terms have specific meaning within the context of this research. The terms associated with the PAT model were originally defined by Sleezer (1990).

Analyst element. The characteristics of the researcher which can influence the needs assessment process.

Case study. The application of the PAT model in the College, the documenting of the process and findings, and the evaluation of the results.

Characteristics. The distinguishing features of the respective customer, organization member, decision maker, or analyst element that can influence the selection or the ranking of needs and the negotiation of solutions.

The College. The site of the case study, a college of veterinary medicine at a Midwestern university.

Curriculum Development Committee (CDC). A group of faculty of the College whose task was to define the scope of the needs assessment, provide expert assistance to the researcher, and translate the findings into practical changes in the curriculum.

Customer element. The characteristics of the consumers of a service that can influence the process and outcome of the needs assessment. In this study the practitioners were the customers.

Decision maker element. The characteristics of CDC members that may influence the process and outcome of the needs assessment.

Elements. The conceptual framework of the PAT model consisting of the substantive characteristics of the organization, decision maker(s), the analyst, and the customer.

Employers. Veterinarians acting as proprietors or clinic managers who employed or supervised the College's graduates during the study period.

Graduates. Individuals who have completed the College's DVM program, are licensed to practice, and have been employed in private practice in the United States during the study period.

Need. The documented gaps in efficacy or attitude between real and desired performance (Sleezer, 1992; Smith & Roth, 1990).

Needs assessment. A systematic process for determining goals, identifying discrepancies between goals and the status quo, and establishing priorities for action (Burton & Merrill, 1977). In the context of the case study needs assessment refers to the College's curriculum investigation performed within the framework of the PAT model.

Organization element. The College, its members, and its teaching activities.

PAT. "A performance analysis model for discriminating between training-related needs and other needs through a process in which the analyst and the decision makers ... negotiate the performance goals that are important to the organization and the knowledge or skills needed to reach those goals" (Sleezer, 1990, p. 359).

Practitioners. Graduates of the College and their current or former employers who are engaged in private veterinary practice.

Private practice. An animal care service that is not publicly owned and is operated as a business.

Proficiency. The skill or knowledge demonstrated by graduates in practice.

Proficiency review. The survey instrument that assessed practitioners' perceptions of graduates' proficiencies and documented felt needs related to the quality of the College's curriculum.

Rhetoric. "Any communication element, verbal or nonverbal, intended to induce cooperation in the service of outcomes" (Shapiro & Schall, 1990, p. 323).

Stakeholders. Practitioners, administrators of the College, and teaching faculty who have professional interests in the College's DVM curriculum.

Study period. The years 1992 through 1996 for which the College's 1991 through 1995 graduates had been in private practice at least one year.

CHAPTER II

REVIEW OF THE LITERATURE

A curriculum is the configuration of a process for becoming responsive, accountable, and productive in education (English, Zaharis, & Kaufman, 1971). To achieve these goals a curriculum must establish priorities. Given all the knowledge that can be learned, educators must budget instructional and education resources to achieve the outcomes that are most in demand by society (Gutek, 1988; Morris & Pai, 1976). Educators may take for granted that a curriculum makes desired outcomes predictable; however, a curriculum must be reviewed and modified periodically as changes in society or technology impact a profession. It is sensible to reflect on Tyler's (cited in English, 1978) belief that curriculum evaluation ought to be "a practical enterprise and not a theoretical study" (p. 60). Therefore, gathering empirical data about curriculum-related needs from those who use their educations professionally can be helpful in making instructional changes.

Overview of Needs Determination

Curriculum change often begins with a process of determining where innovation is wanted and how much is desirable. In a pragmatic design, there must be a documented basis for the content of instruction and for making changes to it (Gagné & Briggs, 1974). This referent is typically supplied by a formal process of needs assessment. An investigation of the needs is typically performed at the beginning of the development, review, or change effort to (a) define curriculum content or what is to be appraised, (b) define outcomes and validate objectives, (c) identify achievement discrepancies between current and intended outcomes, (d) uncover problem solutions and causes, (e) distinguish between training and other performance solutions,

(f) establish planning directions, (g) gather referent information for decision making, (h) involve and establish commitment from decision makers, and (i) monitor changes in situations or trends in a profession (Birnbrauer & Tyson, 1985; Burton & Merrill, 1977; English & Kaufman, 1975; Kaufman, 1983, 1985, 1987; Kaufman & Valentine, 1989; Rodriguez, 1988; Rossett, 1990; Smith & Roth, 1990).

Definitions of Need

Writers in education and training have used different approaches to describe the concept of need. Stufflebeam (cited in Brinkerhoff, 1986) proposed that needs investigations are either diagnostic, democratic, analytic, or they point to discrepancies. Diagnostic studies uncover the causes of defined needs based on current problems. Democratic needs are representative of the expressed grievances or desires of most of the people in an organization or a population. Needs that are suggested by expert opinion or determined through inductive research are analytic. Needs become discrepancies when a person or a group's current performance falls short of the expected achievement. Each need type applies to a different circumstance and leads to a different curriculum.

Bradshaw (cited in Burton & Merrill, 1977; Lee & Roadman, 1991) described four categories of social needs that also may apply to curriculum needs. Normative needs exist as differences from established standards, regulations, and population norms. Instruction leading to licensure reflects normative needs. When two similar organizations are performing at different levels a comparative need exists. Felt needs are the desires of a constituency; employees want opportunities to improve their job satisfaction, and customers desire value from their suppliers. Demand needs arise when human or material resources are scarce relative to the demand for them. Changes in curricula occur as demand needs are expressed following changes in technology, economic climate, or society.

Dick and Carey (1977) proposed that the outcomes of a curriculum review can be clustered into three categories of need: (a) adding or updating content, (b) teaching learners from new populations, and (c) incorporating innovative delivery techniques in an existing curriculum. Through clustering needs, analysts can discriminate among those needs that do not require training, those predicaments for which solutions are expected to result in little improvement, and those interventions that are believed to have the greatest impact upon a performance problem. Rossett (1987) stated that needs linked to training could be explained by five substantive types of information: (a) the optimal condition or level of performance; (b) the actual performance measured or observed; (c) the feelings of participants; (d) the cause(s) of a problem in the opinion of a participant; and (e) the solution(s) to the problem or need in the opinion of a participant. The gap between optimal and actual, and among feelings, causes, and solutions, is the true performance need. By organizing needs into categories, education decision makers can focus their resources upon the areas of a curriculum that require attention.

Descriptions of Needs Determination Concepts

Newcomers to the practice of determining needs may agree with Kamis (1979) that every reference to needs assessment seems to imply a different technique. The terms needs assessment, needs analysis, and performance analysis are often used interchangeably, and definitions are not consistent within the field (Jonassen & Hannun, 1986). The following descriptions attempt to separate those terms:

Needs assessment. English and Kaufman (1975) described several characteristics of needs assessment that are important to this study:

Needs assessment is a process for defining the desired outcome, product, or result of a given sequence of curriculum development Needs assessment is not by itself a curricular innovation, it is a method for determining if innovation is necessary and desirable Needs assessment is an empirical process ...

a set of criteria by which curricula may be developed and compared Needs assessment is a process for determining the validity of behavioral objectives Needs assessment is a logical problem solving tool ... which formally harvests the gaps between current results and required results, places those gaps in priority order, and selects those of the highest priority for action through the implementation of a new or existing curriculum. (p. 3)

Kaufman and English (1979) later defined needs assessment as "the formal, systematic attempt to determine gaps between current outcomes and desired outcomes, to place these gaps in priority order, and to select the most important for research" (p. 2). A common interpretation of Kaufman and English's definition was given by Lee and Roadman (1991, p. 4): a "systematic process for determining goals, identifying discrepancies between goals and outcomes, and establishing priorities for action." Lampe (1986) summarized needs assessment of work performance as an "effort to reveal the gaps between what people do at work and what their employers would like them to do" (p. 101). Similar definitions occur frequently in the literature of education and training (see Kaufman, 1983, 1986, 1987; Kaufman & Valentine, 1989; Lewis & Bjorkquist, 1992; Smith & Roth, 1990; Zemke, 1994). Burton and Merrill's (1977) definition includes a description of the process:

Needs assessment is a systematic process for determining goals, identifying discrepancies between goals and the status quo, and establishing priorities for action. With respect to education, needs assessment is a process for determining what should be taught. This process is based on the active involvement of those directly affected by the educational system ... in addition to professional educators. (p. 21)

Needs analysis. Whereas needs assessment is holistic and involves identifying and ranking gaps within the organization's operation, the most frequently cited description of needs analysis is that it uncovers the cause of those gaps and recommends

solutions (Benjamin, 1989; Herbert & Doverspike, 1990; Kaufman, 1985; Witkin, 1984). Kaufman and Valentine (1989) suggested that needs analysis be used to decompose the problems found with needs assessment to get to the sources of the needs and recommend the means of their solution. Thus, needs analysis is meant to provide both a microscopic view of performance deficits and a plan for intervention.

Performance technology. Performance technology (PT), sometimes called performance analysis, is an example of system theory applied to performance improvement and change. Like needs assessment, PT has been defined differently by many writers. Benefit and Tate (cited in Stolovitch & Keeps, 1992) described PT in terms of procedures: PT is "the process of identifying opportunities for improvement; setting standards; developing strategies; analyzing and choosing compatible, cost effective approaches; and evaluating the resulting changes" (p. 6).

Other authors take a systemic view of PT. Stolovitch and Keeps (1992) defined PT as a "field of endeavor that seeks to bring about changes to a system in such a way that the system is improved" (p. 4). Harless (cited in Gordon, 1992) defined PT as "a systematic process for influencing the actions of people to produce valuable organization outputs" (p. 29). Rosenberg (1988) believed PT consisted of analysis, interventions, and evaluation linked as a system for improving human performance. Rummler and Brache (1991) argued that every employee exists within a unique performance system. An organization's success in realizing its outcomes is determined by the composition of the system: the job's inputs, processes, consequences and feedback, and the employee's abilities.

PT's distinction is its emphasis on "organizational performance as a function of individual ability and the work environment" (Rummler & Brache, 1991, p. 275). PT bases the success of interventions on measurable changes in an individual, a process, or the organization (Gordon, 1992). Mager and Pipe's (1970) PT model has been cited in human resources literature as an algorithm for analyzing situations and discriminating

between performance problems resolved through training and other discrepancies (Regalbuto, 1992; Stone & Meltz, 1993).

Needs assessment, needs analysis, and performance technology employ problem recognition, inquiry, and decision making for improving human performance at work. The value of these approaches is in the frameworks they provide for understanding how organization goals, work processes, and individual performance are interconnected. Stolovitch and Keeps (1992) outlined five critical attributes of performance analysis. First, a framework is systemic; it views the actions of performers as affecting the entire organization. Second, it is methodical in its approach to problem determination and resolution. Third, it seeks outcomes that are valued by the organization and that satisfy the needs of the organization and its members. Fourth, it is based on theories derived from research and from documented case evidence. Finally, it permits the use of any technique that is systematic, effective, and economic. The needs assessment model selected for the case study needed to meet these criteria.

Needs Assessment Models

The literature of needs assessment contains many models for recognizing individual and organizational needs. Selecting a technique for a particular circumstance is easier when the models can be viewed within a framework. This section of the study divides needs assessment models into two groups, those designed for educational use and those used in business.

Needs assessment in education. Needs assessment is a recognized part of curriculum planning, implementation, and evaluation (Witkin, 1984). Kaufman (1972, 1983) applied needs assessment to education planning in a four-step process based on system theory: (a) determine the instructional goals, (b) determine the achievement of those goals relative to the status quo, (c) identify the discrepancies between the two, and (d) rank them. The discrepancy model has been described often in education publications (Kimpston & Stockton, 1979); yet, there is little empirical evidence in the

literature that those models have been put into practice.

Dick and Carey (1977) developed a three-step process for developing education goals and instruction using needs assessment. First, needs assessment is used to document gaps in performance outcomes. Second, it is used to discriminate between instruction-related needs and other types. Finally, it is used to develop materials to solve the instructional needs and evaluate their effectiveness. In both approaches, needs assessment provides information to define a problem; however, Kaufman's model does not include problem solving while Dick and Carey's model includes the extra stages of resolution, implementation, and evaluation.

Needs assessment in business. There are many applications of needs assessment in business and industrial training publications. For example, Kaufman (1985) proposed the Organization Elements Model (OEM) as a systemic approach to uncovering the origin of needs. The OEM links together inputs, processes, work products, organization outputs, and societal outcomes, respectively, so the analyst can better distinguish between needs as means (inputs and process) and needs as ends (products, outputs, and outcomes). Because the OEM views an organization as two systems, the actual and the ideal, it allows the analyst to first identify performance gaps using needs assessment then to determine which criteria or operations are keeping the present system from becoming optimal (Kaufman & Stone, 1983).

Rossett (1987) incorporated uncovering gaps between actual and optimal states in the Training Needs Assessment model (TNA). TNA assesses Rossett's five types of needs (actual, optimal, feelings, causes, and solutions) in situations characterized by performance problems, technological change, or repetitive instruction. Unlike OEM, TNA assumes the problem has been identified by the organization decision makers before the model is initiated.

In contrast to Rossett's approach, Rummier and Brache (1991) stated that attempts to improve organization outputs or individual performance through training

alone are likely to fail. The authors proposed that performance depends upon factors within individual workers and in the work environment. Because the performer is part of a subsystem of processes within the organization, we may not be able to identify or attack problems directly. Rummler and Brache proposed analyzing performance beginning at the organization level, where the firm interfaces with its customers. When the organization's needs have been defined and assigned to functions, the performance analysis moves to the process level. When the process needs have been defined and assigned to duties, the analysis moves to the individual level. At the level of the performer we can determine where skill or knowledge is below par. The Rummler and Brache model made two unique contributions to needs assessment: It included customers in an organization's system, and it portrayed individual performance as relevant to organizational performance.

The concept of investigation on three levels was first proposed by McGehee and Thayer (1961) and has been included in other needs assessment models (see Goldstein, 1986; Moore & Dutton, 1978; Sleezer, 1991; Smith, Delahaye, & Gates, 1986; Zemke & Kramlinger, 1982). McGehee and Thayer's model can determine early in the process whether training is the appropriate response to a problem, but it does not include the customer or analyst in the stages of investigation.

Starting and ending the process. Needs assessment models differ in where they begin an investigation and in where they conclude (Kimpston & Stockton, 1979). Models that incorporate McGehee and Thayer's (1961) three-level view of performance, begin at the organization level and proceed toward the performer level until the problem is fully explored (Goldstein, 1986; Rummler, 1992; Rummler & Brache, 1991; Sleezer, 1991). Rossett's (1987) TNA assumes the problem and the employees responsible for changing the problem already have been identified, and the objective of the need assessment is to learn the details of the problem so suitable training can be delivered.

Needs assessment for instruction development or curriculum evaluation concludes with defined educational goals or program objectives (Dick & Carey, 1977; Goldstein, 1986). Similarly, authors who based their education or training needs assessment models on Kaufman's (1985) OEM ended their models after the needs had been ranked and action upon them decided (see Benjamin, 1989; Burton & Merrill, 1977). Mager and Pipe (1970) concluded performance analyses in industry after choosing an intervention that was appropriate, workable, cost effective, and valued by customers. Sleezer (1992) proposed that the ending point in the process is defined by the purpose for doing the needs assessment. Sleezer went on to say the results of needs assessment typically will be (a) information about the needs, (b) the prioritization of identified needs, and (c) the involvement of decision makers in the investigation and resolution process.

The Performance Analysis for Training Model

The PAT model is based on needs assessment theory and information from expert practitioners (Sleezer, 1991). The PAT model is unique among needs assessment models in that goals, performance criteria, and needs are perceived, negotiated, and prioritized through a deliberative process involving the problem's stakeholders. The PAT model has three parts: (a) a conceptual view of the elements that influence decisions about training needs; (b) a systematic process for determining whether a training-related problem exists at the organizational, work process, and / or at the individual level(s); and (c) a set of worksheets to guide the analyst through the process of problem exploration, analysis, and intervention determination. The PAT model including the conceptual components, phases and steps, and worksheets is included in Appendix A.

The PAT model's premise is that through interaction of the elements—the organization, the decision makers, and the analyst—performance needs or opportunities are perceived, negotiated, and prioritized (Sleezer, 1995). Studies implementing the

PAT model have resulted in (a) accurate and sufficient information about needs to permit the decision makers to judge the appropriateness of a training intervention, (b) information that was useful to the designer(s) of the intervention, and (c) decision makers' involvement in the needs assessment process and results (Sleezer, 1995).

The PAT model's systematic process includes three interacting phases. In Phase One, Organization Analysis, the objective is to uncover where in the organization a training emphasis should be placed. The steps in Phase One are (a) identify the perceived opportunities or needs; (b) determine the purpose and parameters of the analysis; (c) gather information about potential training opportunities or needs; (d) gather anecdotal information; (e) analyze the information; (f) report the findings to the decision maker(s); and (g) acknowledge, prioritize, and determine the training opportunities or needs with the help of decision maker(s).

In Phase Two, Work Behavior Analysis, the analyst identifies and documents the specific behaviors needed to accomplish the work. To accomplish that, the analyst (a) identifies the work to be analyzed, (b) constructs a Work Behavior Analysis plan (see Swanson & Gradous, 1986), (c) conducts the Work Behavior Analysis, and (d) gathers anecdotal information.

In Phase Three, Analysis of Individual Capabilities, the objective is to determine which employees need training and the kind of training they need. To accomplish these things, the analyst (a) identifies the characteristics and capabilities of the group of trainees; (b) gathers anecdotal information; (c) gathers information about nontraining causes of performance; (d) synthesizes and analyzes the information; (e) reports the findings to the decision maker(s); and (f) communicates the findings and anecdotes to those who will design the training. The PAT model includes worksheets to help the analyst work through each step in the three phases of the process.

The PAT model integrates key features of earlier needs assessment models. First, the PAT model begins at the organization level and moves to the process and individual

levels in investigating the problem and seeking agreement. Second, evidence is gathered to decide between training or other interventions at each of the three levels of investigation. Third, it seeks the goals, culture, and rhetoric of the organization and causes and solutions from organization members on performance discrepancies. Fourth, it is systemic because at each level of investigation information resources are transformed into decisions regarding needs. Finally, the PAT model concludes with a report to the decision makers and asks them to acknowledge, negotiate, and prioritize performance needs or opportunities.

The PAT model also meets Stolovitch and Keep's (1992) criteria to be called performance technology. The PAT model is (a) systemic in identifying performance gaps as elements of a system; (b) systematic in its method of identifying needs; (c) grounded in the theories of needs assessment and analysis; (d) open to all means, methods, and media; and (e) focused on achievements that decision makers and organization members value.

Field Testing the PAT Model

The PAT model was validated by subject matter specialists in needs assessment, and tested in business and manufacturing settings. The first application was performed by Sleezer (1990) in a financial company where managers wanted to know if training would improve their customer service rating. Each Phase of the PAT model (the organizational level, the process level, and the individual performer level) was carried out in that application. Sleezer reported gathering and analyzing data from each of the organization elements and presenting the findings to the business decision makers for a disposition.

Evaluating the first application of PAT was done in three stages. First, the business decision makers were asked if the PAT model had (a) involved them in the needs assessment process, (b) provided them with ample and accurate information for decision making, and (c) produced enough information for designing an intervention.

The decision makers acknowledged involvement in the needs assessment process. In the second stage, each stakeholder confirmed that the analyst's understanding of the organization was accurate. The decision makers reviewed the Phase One, Stage Two worksheet notes and agreed that the observations looked accurate. The review of data by respondents ensured that the analyst understood the organization characteristics and the work process as recommended by Fielding and Fielding (1986). The third stage of evaluation involved using expert reviewers who were external to the organization to validate the PAT model's specific application and its outcomes. Four needs assessment specialists who were not associated with the research looked over the design of the PAT model, the research proposal, the investigation notes, and the worksheets. Afterward, they completed evaluation forms that rated the PAT model's suitability for a business application and effectiveness in determining training needs at the test company.

The PAT model was deemed valid by the four specialists, and they suggested modifications to Phase One to be included in future research. Two reviewers thought the PAT model could be used to understand performance problems that did not require training, and another felt that the model should include an element representing the organization's market.

Sleezer (1995) tested the PAT model a second time in a refinery where the decision makers wanted to know what skills employees needed for the plant to continue to be competitive in the future. Implementing the three phases of the PAT model helped the decision makers perceive the specific knowledge and skills that workers and supervisors would need to have.

Sleezer (1996) tested the PAT model a third time in a manufacturing setting where the decision makers wanted to know if training would speed their transition to integrated manufacturing. Phases One and Two were implemented. The outcome did not result in a training recommendation, but implementing the PAT model lead to a recommendation to first resolve process problems that did not involve training. Sleezer

concluded that implementing the PAT model (a) involved the organization's decision makers, (b) lead to a cost-effective decision, and (c) demonstrated that the characteristics of the organization members, decision makers, and analyst do influence needs assessment outcomes.

Modifications to the PAT Model

This research proposed to expand the PAT model with the addition of a fourth element, the customer, and to implement the model in an education setting.

The customer element. Every customer has a stake in a supplier's products or services, and the supplier's welfare depends upon the value that customers place on its outputs, (Geber, 1990). Thus, a competitive organization can be measured, in part, on how thoroughly its outputs satisfy customers' needs (Drucker, 1974; Kaufman, 1977, 1985; Rummler & Brache, 1991; Zangwill, 1994). Performance solutions using instruction must support the relationship between an organization's processes and customers' requirements. Robinson & Robinson (1995) stated that education also must be responsive to its clientele, and needs assessment offers the formal approach to discover the concerns of that group.

Using the PAT model in situations where an organization's needs are linked to outsiders' needs suggests the model should include a customer element. Kramlinger (cited in Sleezer, 1990) suggested several reasons for including an organization's market as part of the PAT model. First, adding customers to the PAT model forces decision makers to define and think about the populations that are critical to the organization's success. Second, the inclusion of customers helps decision makers plan the actions needed to satisfy clients. Third, the presence of a customer element in the needs assessment model highlights the relationship between worker performance and the organization's success, a relationship that is often forgotten or not realized by administrative decision makers.

Appendix B contains revisions to the PAT model's conceptual framework. The illustration in Appendix B shows the conceptual framework with the addition of the customer element. Integrating the customer element into the framework meant understanding the substantive characteristics of the client and acknowledging the client's needs. Therefore, Appendix B also contains a customer worksheet to be included with the other element worksheets in Step Two (A). The questions on the worksheet incorporated perspectives from human resources literature. The citations are noted on the worksheet.

Application to education. Some authors have viewed the methodologies used for educational planning, needs assessment, and instruction design as overlapping those used for training, while other authors have differentiated between them. Goldstein (1986) stated that in both job training and professional education effective instruction comes from systematic learning that is intended to change the workplace. Briggs (1977) believed that instructional strategies, including needs assessment, "apply equally to education and training, for learning is the purpose of both" (p. 20), and a curriculum "is intended to refer to the total instruction being planned whether it may be a workshop or a job training effort or an education course" (p. 99). Kaufman and English (1979) also believed needs assessment could be used in a variety of applications: "Needs assessment is a concept and a tool which can be used in areas other than education" (p. 338), and "the techniques suggested for education [in the text] are appropriate for use in the military" (p. 335). Harless (cited in Trimby, 1979) included government, education, and business applications in his needs determination process.

Some authors have differentiated between education and other learning settings. Stolovitch (cited in Jonassen, 1988) noted that education tends to be general while training is meant to be job oriented; education is concerned with knowledge and process while training is focused upon a defined outcome. In addition, industrial training must produce financial benefits, whereas education is not evaluated in terms of revenue or

markets. Sleezer, Sleezer, and Pace's (1996) definition of human resources development (HRD) delimited that field, saying HRD can occur in business, industry, military, or public sector organizations but does not include educational institutions. Edmonds, Branch, and Mukharjee (1994) believed that "concepts, theories, and models have an ecology, a context within which they are developed and within which they function. Importing a theory or model from a different context without attention to differences violates this ecology" (p. 67). Since higher education, business training, and government training originated in response to the needs and regimen of their contexts, Edmonds, Branch, and Mukharjee argued that using a model from a different context may result in poor solutions. Nadler and Nadler (1994) stated that training models must be considered carefully before modifying them for education use since an educational application may present problems that were not present in industrial training.

This case study hypothesized that the PAT model, designed for business applications, could be applied successfully in a higher education setting for assessing the efficacy of a specific curriculum. Chapter III explains the research methodology used to test the modified PAT model.

CHAPTER III

METHODOLOGY

The purpose of this research was to develop a deeper understanding of a specific needs assessment model, PAT, by expanding it to include an additional element, by applying it in a different organization setting, and by involving a different analyst. The research was conducted as a case study. Creswell (1994) described a case study as "exploration of an entity or phenomenon bounded by time and activity (a program, event, or process) that collects detailed information by using a variety of data collection procedures during a sustained period of time" (p. 12).

This case study used a deductive model with qualitative data as described by Miles and Huberman (1984). Miles and Huberman described the use of a conceptual framework consisting of constructs from relevant literature. Research questions are posed, and an investigative procedure is designed that will provide information for addressing the research question(s). The deductive approach permits findings from naturalistic data to be analyzed and compared to the expected outcomes. In this case study, the conceptual framework was the PAT model modified to include a customer element. The premise of the modified PAT model was that the characteristics of the organization, the decision makers, the analyst, and the customer affect the process and results of a performance analysis. The study, as designed, involved (a) implementing the modified PAT model in a higher education setting, and (b) examining the needs assessment process and results to determine whether the research questions and subquestions were answered. This chapter describes the case study unit, the stakeholders, and the research design.

The Case Study Unit

The target organization in this case study was a college of veterinary medicine in a mid-continent U.S. land grant university. The College offered the professional degree of veterinary medicine and graduate degrees in biological specializations. Veterinary medicine students could choose elective courses in four emphasis areas: small animals, food and fiber animals, equine, and mixed species. Some of the College's 72 faculty believed the curriculum had to become responsive to the needs of veterinary practitioners in order to compete successfully with other veterinary colleges. The College faculty had modified the curriculum in 1986 to permit students to emphasize a particular animal group. In 1996 the faculty again reviewed the curriculum with the intention of making it more relevant to the animal care market.

The College faculty were motivated by calls for action to all the North American veterinary educational institutions from veterinary professionals writing in journals and speaking at conferences. The faculty's concern for the curriculum was driven by (a) the need for veterinarians to make business decisions; (b) increased reliance on technology and information within the profession; (c) changes in regional economies that forced graduates to take employment in species clinics outside their veterinary education emphasis areas; (d) a nationwide decline in applicants among veterinary schools; (e) animal owners who expected service quality and personal consultation; (f) a societal shift from curative to preventive animal care; and (g) a renewed emphasis on professional values within the accreditation policies of the American Veterinary Medical Association (Pritchard, 1987; Pritchard & O'Neil, 1991; Talbot, 1989). However, the College had no documented information about graduates' proficiency in practice that would enable them to assess the scope and quality of the existing DVM program. Also, they had no exposure to needs assessment methods. The following sections describe the stakeholders and the research design which consisted of data gathering methods, research instruments, and the data analysis.

Overview of the Stakeholders

Four stakeholder groups in this case study represented the four elements in the modified PAT model—the organization, the decision makers, the analyst, and the customer. Each element is discussed below. The analyst gathered information about the four elements concurrent with gathering data for the needs assessment. The information was required to complete the PAT worksheets (included in Appendix A, part 2 and Appendix B, part 2).

The decision maker element. The decision makers were nine faculty serving on the Curriculum Development Committee whose task was to translate the needs assessment findings into guidelines for designing the new curriculum. Two individuals represented each of the College's four departments, and the Associate Dean served as an ex-officio member representing the administration. Observing the CDC as it reviewed the curriculum and talking to individual members about the organization helped the analyst define the decision makers' salient characteristics.

The organization element. The organization element was represented by the College of Veterinary Medicine. The decision makers and the analyst agreed to limit the organization element respondents to administrators and teaching faculty. The CDC suggested names of teaching faculty who could inform the analyst of the College's curriculum and who held diverse views about instruction. The analyst purposefully selected the interviewees from the organization's clinical science and basic science areas.

The analyst element. According to the PAT model, analyst element characteristics also have an impact on the needs assessment. The way the analyst gathers and analyzes data, develops conclusions, and interacts with the other PAT elements influences the process and results of the study. The analyst element in the case study was the researcher, and the relevant characteristics included his knowledge of performance models, experience in needs assessment, and feelings about the research

problem and setting.

The customer element. The customer element consisted of veterinary graduates and their employers who used the College's outputs: new veterinary graduates and extension education. The graduate population was composed of the College's 307 DVM graduates from 1991 through 1995.

Two sources of information about graduates were accessed during the needs assessment. One source came from preceptorship reports—students' evaluations of preceptors' clinics and practices. During their final year in the curriculum, each student participated in a six-week supervised term at an animal care or research facility and wrote reports about how veterinary medicine was conducted. The Director of Preceptorship Programs at the College made these reports available to the analyst. The reports supplied information about student abilities, employer characteristics, and the work environment. A second source of practitioner information was the proficiency review (a survey) conducted by the analyst. The proficiency review assessed graduates' and employers' perceptions of graduates' abilities and documented felt needs related to the quality of the College's curriculum. The Head of Extension Services at the College assisted the analyst in assembling mailing lists of graduates and their employers.

Two hundred seventy-nine graduates (91%) were employed in private practice in the U.S. and were candidates for the needs assessment. The survey budget limited the sample to 146 graduates, 52% of those eligible. Graduate selections were made from the College's 1991 through 1995 graduation register according to five factors: First, the graduate had to be employed in a private practice based on information found in the American Veterinary Medical Association (AVMA) directories of 1992 through 1996. Second, the four emphasis areas needed to be represented as fully as the graduation register and sample size permitted. Third, males and females were to be represented in approximately equal numbers. Fourth, the sampling had to be distributed widely among four regions of the United States—East, South, Central, and West—where graduates

were employed. The states included in each region are listed in Appendix H, part 1. Finally, each graduating class needed to be represented in similar numbers to the extent the other factors permitted. The graduate population was not large enough to emphasize all five factors equally and conduct a large sampling; therefore, the five factors were used as selection criteria. The criteria were ranked as listed above. The sampling was purposive within each criterion.

The employer population was defined as practitioners who had observed graduates' clinical work during the study period. They consisted of veterinary clinic proprietors and animal hospital managers who had hired or supervised one or more of the College's recent graduates. Employers had to have been engaged in private practice and have employed one or more of the 279 eligible graduates within the study period. Two hundred nine employer names were accumulated based on recommendations from the Head of Extension Services and names taken from AVMA membership directories. Employers were selected whose AVMA membership address corresponded to the membership address given by a graduate. Because graduates often changed employment during the first five years of work, this sampling process was repeated for each of the eligible graduates for each year following graduation. Although laborious, this sampling method generated a list of employers for the needs assessment.

Overview of the Research Design

This case study consisted of two parts: the application of the PAT model as a needs assessment, and a systematic study to answer the research questions. The needs assessment was designed to provide the College with information about strengths and deficiencies in the DVM curriculum. Answering the research questions involved studying the interaction of the four elements with respect to the needs assessment.

The analyst used the PAT worksheets (Sleezer, 1990) as a guide in designing the data gathering and analysis portions of the case study. Because the decision makers were interested primarily in determining the organization's needs, only the first phase of

the PAT model, Phase One: Organization Level, was used in this case study. Also, because the modified PAT model included an additional element, the customer, the analyst created a conceptual framework that included the customer and a worksheet for gathering data about this added element (see Appendix B).

The following events outline the investigation carried out in this case study:

1. The analyst interviewed faculty administrators (parts of the organization element) to gather information about the scope of the needs assessment. The analyst completed portions of Steps One through Two (B) of the PAT worksheets to identify perceived needs or opportunities and to determine the purpose and parameters of the needs assessment. Specimen worksheets are included in Appendix A, part 2.
2. The analyst met with the CDC and discussed the proficiencies to be included in the proficiency review instruments.
3. The analyst developed the proficiency review instruments: one for graduates and one for employers. The CDC reviewed the instruments and suggested improvements in layout and nomenclature.
4. Preliminary versions of the proficiency instruments, letters of instruction, and worksheets for assessing the instruments were mailed to practitioners as a pilot test. The CDC examined the returned instruments and discussed the reviewers' suggestions.
5. Final versions of the instructions and proficiency instruments along with an introductory letter from the Dean were bundled into packets. The analyst selected names of graduates and employers who would receive the proficiency review packets. The packets were mailed by an administrative assistant in the College. Two weeks later, the administrative assistant mailed a second packet to each practitioner who had not returned the instrument.
6. The returned proficiency review instruments were analyzed. Analyzing the survey involved tabulating proficiency ratings and transcribing practitioners' suggestions by curriculum topic for each of the practitioner groups. Needs and curriculum

suggestions, as curriculum deficiencies, were ranked using Pareto's (Robertson, 1990) frequency distribution.

7. The analyst reviewed the preceptorship reports to gather information about the proficiency characteristics of the graduates (as students) and the characteristics of practicing employers and workplaces. The analyst summarized the notes on the Extant Data Worksheet.

8. The analyst filled in portions of PAT worksheet Steps Three through Seven.

9. The analyst presented the needs assessment findings to the CDC, and the final project report to the College Dean, Associate Dean and CDC.

10. The analyst observed the CDC as it discussed the needs assessment findings, reviewed the existing curriculum, and designed a new curriculum. The analyst noted the biases, concerns, and rhetoric expressed by the decision makers.

11. After the CDC had distributed the needs assessment findings and the proposed curriculum for all faculty to consider, the analyst interviewed seven teaching faculty to get perspectives on the organization, the customer, and the curriculum.

12. Additional faculty were interviewed to learn more about the organization's culture and rhetoric.

13. A brief report of the findings of the needs assessment and the actions taken to revise the curriculum was mailed to each practitioner who returned a proficiency review instrument.

14. The analyst reduced the observation, faculty interview, extant records, and organization culture data to synopses. The information providers were asked to read and verify the accuracy of the findings using verification worksheets designed for the task.

15. The analyst used information from the synopses to complete unanswered actions and update initial entries in the PAT worksheets. He used the worksheet data and the needs assessment report to review the case study findings and answer the

research questions.

16. Members of the CDC evaluated the needs assessment using Curriculum Committee Evaluation Worksheets.

17. An independent reviewer examined the case study data. The reviewer evaluated the results of the study using a worksheet based on the research questions.

Events #1 through #4 initiated the needs assessment. Events #5 through #14 focused on gathering, reducing, and displaying the needs assessment data. Events #15 through #17 focused on the three-stage data analysis and evaluation process used to answer the research questions.

Overview of Data Gathering Methods

Purposive sampling was used to select subjects from the information sources because (a) the population of graduates to be surveyed was bounded, but some could not be identified by type of practice; (b) the defined population of employers was not bounded and not evenly distributed geographically or by practice type; and (c) some faculty interviewees were thought to be more active in the decision making process than others. Access to populations is an important determinant in designing research. Because the stakeholders exhibited different physical dispersion and degrees of involvement in the needs assessment, different data gathering methods were required. This study relied upon four investigative methods: observation, interviews, extant records analysis, and surveys.

Observation. Sleezer (1991) stated that organization characteristics can influence the needs assessment process and have an impact upon its recommendation. Participant observation provided the researcher with insight into the College's system, organization rhetoric, teaching and working environment, curriculum revision process, and actions of the decision makers. The observation occurred throughout the project and especially at scheduled CDC meetings which required the analyst to record group proposals, objections, decisions, and anecdotes while the members discussed curriculum revisions

and proficiency statements used on the proficiency review instruments.

Proficiency reviews. Surveys, called proficiency reviews, were used to gather data about the graduates' and employers' perceptions of the program. The instruments produced (a) self-appraisals of proficiency by graduates, (b) appraisals of graduates' proficiency by employers, (c) suggestions for the DVM curriculum, and (d) demographic information. Because the proficiency reviews were developed as part of the needs assessment process, their design is detailed in the events of Chapter IV.

Extant records. Preceptorship reports were an existing source of information about the DVM program. The preceptorship reports had been written by final year students at the completion of their externships and were designed to help a student evaluate the host's practice and assess his or her skills and knowledge. The Director of Preceptorship Programs agreed to provide the analyst with the 1991 through 1995 reports. The analyst anticipated that the reports could identify desirable knowledge, capabilities, and motives in students and salient characteristics of employers.

Interviews. Interviews were used to learn about the nature of the problem (suggested by Rossett, 1987) and involved talking to key individuals in the College. Potential topics for the administrator interviews included the College's goals, its history (suggested by Smith & Roth, 1990), the time schedule and scope of the needs assessment (suggested by Zemke & Kramlinger, 1982), the expected outcome (suggested by Leeds, 1993), and the veterinary groups they wished to survey.

Interviews also were used to gather data from individual faculty members about what was expected of graduates, what they had heard from the field, and their thoughts upon changing the curriculum. Additionally, the analyst used interviews to gather data about the organization's culture, rhetoric, politics, and system.

To assure accuracy of the interview notes, the analyst used two techniques suggested by Spradley (1979): the verbatim technique and the language identification technique. The verbatim technique calls for recording the exact words that are spoken

by all parties rather than the analyst's paraphrase or interpretation. Spradley also noted that a partial verbatim record can be more useful than a complete nonverbatim summary. The partial verbatim technique helped the analyst document the goals, feelings, needs, and curriculum solutions expressed by the interviewees. The language identification principle requires differentiating the identities of speakers in the field notes. In this way, the written record can reflect the jargon used in the field situation. The analyst did not record the identities of faculty interviewees, maintaining the confidentiality of information providers; however, he did separate his insights from interviewees' verbatim statements by enclosing the insights in parenthesis.

Overview of the Research Instruments

This case study used both available and specially designed instruments to conduct the needs assessment and answer the research questions.

Instruments Used in the Needs Assessment

This section describes the two instruments used in conducting the College's needs assessment within the context of the PAT model.

Proficiency review instruments. The survey of practitioners required the analyst to design two instruments that measured graduates' perceived proficiencies. Separate instruments were needed to state the proficiency questions clearly to each practitioner group. To obtain proficiency information that would have content validity and have face validity with practitioners, the analyst asked the CDC to specify proficiencies relevant to practice and linked to the DVM curriculum (Event #2). The analyst used the specified proficiencies to write proficiency statements that reflected knowledge, capability, and motivation (Event #3). The analyst mailed draft copies to 10 practitioners asking them to pilot test the instruments. He included their suggested revisions in the final instruments. Examples of the proficiency review instruments are included in Appendix C, parts 2 and 3.

Extant records. Descriptions illustrating preceptees' self-perceptions of task proficiency and descriptions of the work environment from the extant records were recorded as notes which were then analyzed using the Extant Data Worksheet (Event #7). The Extant Data Worksheet was based on Gilbert's (1978) model of job competency. Gilbert's model was tested in an education setting by Dean, Dean, and Guman (1995) as a way to organize data. A specimen Extant Data Worksheet is included in Appendix D.

Instruments Used to Answer the Research Questions

This section describes instruments that were used to verify the needs assessment findings, gather information about the organization's culture, and evaluate the outcomes of the case study.

Observation. The observation of the CDC required no special instrument; notes were recorded on paper then reduced to a synopsis.

Faculty interview questions. Structured interviews, recommended by Witkin (1984), allowed the analyst to gather information in a uniform way from all the interviewees. A script was developed to interview the seven teaching faculty (Event #11). The interview script was based on the need classifications primarily suggested by Rossett (1987) and Burton and Merrill (1977). The interview questions asked about (a) knowledge of the College's mission; (b) recognition of the perceived curriculum problem, (c) actual occurrences of knowledge or skill deficiencies, and (d) the feelings, causes, and solutions held by faculty interviewees. The data for each interview were recorded as notes on the script then all were reduced to a synopsis. Appendix E, part 1 contains the complete interview script.

Organization culture questions. Twelve of Shapiro and Schall's (1990) suggested questions for uncovering the culture, rhetoric, politics, and system within organizations were asked of a small number of faculty (Event #12) to get a better understanding of the environment in which instructors implemented the DVM curriculum. The complete list

of organization culture interview questions is contained in Appendix E, part 2.

Data synopses. The analyst summarized the findings from each data gathering method as information pertaining to the College's curriculum needs (Event #14). Each synopsis illustrated salient characteristics of a PAT model element: The observations characterized the decision makers, the faculty interviews characterized organization members, and the surveys and extant records analysis characterized the customer. The synopses also were used to complete the Phase One PAT worksheets.

PAT worksheets. The PAT model relies on a set of structured worksheets to guide the analyst, organize the findings, and develop conclusions. The PAT worksheets were designed to be completed following each step of the performance analysis process (Sleezer, 1995). The PAT worksheets do not specify a particular data gathering method, but seek information about opportunities, characteristics, and needs, allowing the analyst to design a methodology based on the data sources and the accessibility of the elements. The researcher had gotten permission from Sleezer to use the PAT worksheets in this needs assessment, and all but one worksheet used in this study were similar to those designed by Sleezer (1990).

This case study design included two actions with the PAT worksheets not previously taken with respect to a needs assessment. First, the analyst developed a new PAT worksheet, the Customer Worksheet (example included in Appendix B, part 2), to describe the salient characteristics of the organization's customers. The worksheet actions were drawn from needs assessment literature, and the citations are noted on the Customer Worksheet. Second, the analyst used the worksheets to help answer research question 2 and subquestion 2a. Addressing those research questions involved gathering and analyzing data from observation, faculty interviews, and organization culture interviews. The completed PAT worksheets served as the data display.

Verification worksheets. The analyst designed two worksheets to be used in assessing the accuracy of the observation, organization culture, and extant records

synopses. The worksheets were designed to be given to information providers for rating the analyst's data (Event #14). The Observation and Organization Culture Evaluation Worksheet rated the analyst's interpretation of (a) the CDC's actions, characterization, and involvement in the needs assessment and (b) the College's culture, rhetoric, politics, and system. The Extant Data Verification Worksheet rated the analyst's characterization of (a) preceptees' self-perceived ability and (b) veterinary hosts and the work environment. Examples of the two worksheets are contained in Appendix F.

Evaluation worksheets. The analyst designed two evaluation worksheets to assist subject matter experts in rating the outcomes of the case study. The first worksheet, Curriculum Committee Appraisal of the Needs Assessment, was designed to find out what the decision makers thought of the completed needs assessment (Event #16). The worksheet included two items from Sleezer's (1990) independent reviewer evaluation form: the usefulness of documenting needs in understanding the organization's problem (discovering graduates' perceived proficiency) and the usefulness of the needs assessment for resolving the problem (revising the DVM curriculum). Four additional items focused on (a) the usefulness of including a customer element, (b) the degree of members' involvement in the assessment, (c) the presence of needs solutions in the proposed curriculum, and (d) the elegance of the needs assessment process. A final item asked the CDC member to comment on the use of needs assessment in the curriculum review. Each CDC member was asked to complete an evaluation worksheet. The worksheets were expected to be less susceptible to leniency errors (described by Stone & Meltz, 1993) because the members were informed that their responses would be anonymous.

The second evaluation worksheet, Expert Appraisal of Adapting PAT to Veterinary Education, was designed to determine the extent to which an independent reviewer agreed that the case study answered the research questions (Event #17). The independent reviewer's worksheet included the research questions posed in Chapter I

and an additional item from Sleezer's (1990) evaluation form: the PAT model's comparison with other needs assessment models. A final item asked the reviewer to comment on using the PAT model in a higher education setting. Examples of the evaluation worksheets are included in Appendix G, parts 1 and 2, respectively.

Information Security

Approval of research methods and instruments was required by the University's review board for research because this study involved human subjects, and the findings would become public information. Therefore, the analyst recorded the observations, interviews, and extant records without reference to the names of people, practices, and institutions.

The instruments mailed to graduates sought opinions about professional proficiencies which could have been considered sensitive information; therefore, the proficiency review was designed to be anonymous. The administrative assistant who received the instruments agreed to avoid looking at the responses, and she destroyed each envelope before passing the instrument to the analyst. The analyst and the decision makers did not have access to the coded mailing lists. The raw data from the observation, interviews, extant records, and proficiency instruments were held in confidence by the analyst. The needs assessment findings were synthesized for inclusion in the PAT worksheets and are reported as tabulated data and graphs in this study.

Accuracy Measures

The case study design included the following measures to ensure that the instruments, data, and results were accurate.

Instrument content validity. Kaufman (1987) stated that data collection instruments must be valid. The proficiency review instruments, a key data source for the needs assessment, were checked for content validity by two groups of subject matter experts. First, the CDC members (experts in theory) specified the proficiencies they

wished to measure in graduates, and the analyst used these to write proficiency items for the graduate and employer instruments. After the analyst had developed a prototype graduate proficiency review instrument, the CDC reviewed the proficiency items and suggested improvements. The graduate proficiency review instrument served as a template for developing the employer instrument. Second, private clinic veterinarians (experts in practice) pilot tested the instruments and offered their suggestions. The CDC reviewed the practitioners' comments, made additional suggestions, and read the proficiency instruments after the analyst made revisions.

Data accuracy. Although the PAT model was validated in Sleezer's (1991) original research, the addition of a new element and the extension of the model into a different institutional environment required that the case study findings be assessed. Information describing the organization element was checked for accuracy using a method which Fielding and Fielding (1986) termed respondent validation. The teaching faculty interviewees were asked to review their individual transcripts and correct any mistakes that the analyst had made in recording their answers. Fielding and Fielding (1986) and Creswell (1994) recommended triangulation—the testing of findings through repeated, internal measures—as a way to establish the trustworthiness of data that cannot be passed back to respondents, such as the proficiency review data. Triangulation of the proficiency review data were accomplished with two sources. First, extant records were reviewed to discover if the findings from the proficiency review reflected the knowledge, capacity, and motives suggested in the preceptorship reports. Second, two questions on the faculty interviews were designed to supply information about students' skill before they became practitioners.

The PAT model proposes that the analyst element possesses characteristics which influence the needs assessment process and outcome. In this case, the analyst held beliefs from other education disciplines, and he summarized the field data into findings and presented those findings to the decision makers as a concise view of the

situation. The analyst used respondent validation to determine whether his perception of the organization element was accurate: He asked a CDC member to read the Synopsis of Observation and the Synopsis of Organization Culture and assess the trustworthiness of his findings on the Observation and Organization Culture Verification Worksheet. Similarly, he asked a clinical sciences administrator to read the Extant Data Worksheet and rate the accuracy of its information on the Extant Data Verification Worksheet. Both verification worksheets used a five-level Likert-like scale where one indicated a minimum, and five indicated a maximum. Example worksheets are contained in Appendix F.

Independent review. Information about the PAT model along with the data and results of the needs assessment were shown to an independent reviewer. The role of the reviewer was to triangulate the analyst's interpretation of the case study data. The reviewer was a university professor who taught courses employing curriculum needs assessment. The independent reviewer examined the material and offered an opinion on how well the case study answered the research questions and subquestions.

External Validity

The findings of this case study can be linked only to the populations defined for the needs assessment. One application of the PAT model in an educational setting does not validate it for other possible applications in education.

Overview of the Data Analysis

The data gathering methods produced qualitative and quantitative results; therefore, multiple methods of analysis were used for the data reduction and appraisal of the study.

Quantitative Data

The proficiency review produced quantitative data in the form of Likert scale appraisals and categories of demographic information. The proficiency data were tabulated and analyzed using Pareto distribution as recommended by Robertson (1990)

and Hall, Johnson, and Turney (1991). A Pareto distribution assumes that needs do not occur with the same frequency, and that addressing the most frequent causes can significantly affect a situation (Pitt, 1994). The responses to each proficiency were counted and displayed as Pareto distributions (Event #6).

Qualitative Data

The observation, faculty interviews, extant records, and culture interviews produced qualitative data in the form of handwritten notes which the analyst reduced to relevant findings. Miles and Huberman (1984) described a three-step process for qualitative analysis: data reduction, data display, and conclusion / verification. The qualitative needs assessment data were reduced by selecting words or phrases from practitioners' comments about the DVM program and coding them with descriptors. The descriptors included disciplines in the existing curriculum (e.g., surgery, clinics, and pharmacology) and the activities and characteristics of the organization (e.g., the culture, politics, rhetoric, and system). Next, the descriptors were displayed. Data display consisted of synthesized information about curriculum needs and organization characteristics. PAT worksheets Step Four through Six displayed the synthesized information. In reporting the qualitative needs assessment findings, the coded descriptors of graduates' proficiencies were tabulated and charted like the qualitative proficiency ratings.

The final step in implementing Miles and Huberman's analysis process involved forming conclusions from the case study results and authenticating the accuracy of the findings. The analyst formed his conclusions after the data were reduced and displayed (Event #15). Veterinary education subject matter experts, the CDC, evaluated the needs assessment (Event #16), and an independent reviewer evaluated the case study results (Event #17).

Summary of the Methodology

This chapter explained how descriptive data were designed to be gathered. The case study was a deductive design using mostly qualitative data. The investigations were designed to generate findings that would (a) serve the needs assessment's objective—to document the strengths and deficiencies of the College's graduates in private practice and (b) to extend the body of knowledge about needs assessment. Further, the information was crucial to answering the research questions stated in Chapter I. The study required numerous instruments to test the modified PAT model in a setting other than the one for which it had been designed. In addition, the instruments and methods had to meet the University review board's requirements for information confidentiality. Chapter IV explains the data gathered in the investigation phase of this study.

CHAPTER IV

FINDINGS

The purpose of this case study was to develop a deeper understanding of a specific needs assessment model, PAT, by expanding it to include an additional element, by applying it in a different organization setting, and by involving a different analyst. The findings described in this chapter were used to answer the research questions and subquestions:

1. How useful was the modified PAT model for determining deficiencies in a professional curriculum offered at one institution of higher education?
 - 1a. How useful was the inclusion of customers in the needs assessment?
 - 1b. How useful were the needs assessment findings for making changes in the veterinary curriculum?
2. To what extent were the results of the needs assessment influenced by the characteristics of the model's four elements?
 - 2a. To what extent did using the modified PAT model involve the institution's decision makers in the needs assessment process?

Case Study Events

As described in Chapter III, case study methodology was used to gather, analyze, and report information for answering the research questions. The case study consisted of two parts: the application of the PAT model as a needs assessment, and a systematic study to answer the research questions. The needs assessment was designed to provide the College with information about deficiencies in the DVM curriculum. Answering the research questions involved studying the interaction of the four elements of the modified PAT model with respect to the needs assessment. Following are the events

that constituted the case study with descriptions of occurrences and results. In brief, Events #1 through #5 initiated the needs assessment; Events #6 through #14 focused on gathering, reducing, and displaying the needs assessment data; and Events #15 through #17 focused on the three-stage data analysis and evaluation process used to answer the research questions and subquestions.

Events #1 through #5: Initiating the Needs Assessment

In Event #1, the analyst interviewed faculty administrators to gather information about the scope of the needs assessment. In an educational institution, administrators are a useful source of information about the PAT model's organization element. The four administrators who were interviewed—the Associate Dean, Assistant Dean, Head of Medicine and Surgery, and the Director of Preceptorship Programs—each indicated the need to know how graduates and their employers rated the College's DVM program. The College administrators also provided information about the College's goals, the history and importance of the problem, what veterinary groups needed to be surveyed, what was expected of graduates, and feelings about changing the curriculum.

The Associate Dean said that the faculty curriculum development committee, the CDC, was focusing on curriculum review. One objective of the CDC's curriculum review was to obtain documented information about how effectively the existing curriculum prepared students to enter private practice. The CDC stated that the analyst's offer to perform a needs assessment was timely, and the committee agreed to work with him in planning a survey that would gather and document information about practitioners' skills. The Assistant Dean agreed to provide the analyst with logistical support in distributing and collecting the survey instruments.

The analyst used information from the administrator interviews to complete PAT worksheet Steps One and Two (B). The Organization, Decision Makers, and Customer worksheets in Step Two (A) could not be completed until the analyst gathered information about those elements' characteristics.

In Event #2, the analyst met with the CDC and discussed the proficiencies to be included in the proficiency review instruments. The analyst had designed a preliminary survey instrument prior to the planning sessions, and he presented the draft at the first session. The preliminary instrument was based on criteria published in the veterinary literature. However, CDC members felt that the faculty would look at the data from that instrument and say, "So what?" To obtain proficiency information that would have content validity and have face validity with practitioners, the analyst asked the CDC to specify proficiencies that were relevant to actual practice and linked to the DVM curriculum. The CDC members agreed and further noted that (a) the proficiency review should include criteria related to the current disciplines so that graduates' strengths and deficiencies could be identified, (b) a sample of 150 individuals from five graduating classes (1991 through 1995) and at least as many employers would provide adequate data for the curriculum review, and (c) practitioners probably would not object to answering a five-page instrument. The CDC Chair summarized the purpose of the needs assessment and the goal of the curriculum review, explaining, "We must match our wants against the expectations of practitioners." At a following session, the Chair presented the analyst a list of 47 proficiencies which the members had chosen based on disciplines in the existing curriculum.

In Event #3, the analyst developed the proficiency review instruments: one for graduates and one for employers. The analyst used the specified proficiencies to develop proficiency statements that reflected knowledge, capability, and motivation. For each proficiency, separate statements were written for graduates and employers. The two groups of proficiency statements became drafts of a five-page instrument designed for graduates and a five-page instrument designed for employers. Graduates used one instrument to assess their individual level of proficiency, and employers used one instrument to assess the proficiency of the most recent graduate he or she had supervised. The CDC believed the length of the instruments would not be objectionable

to practitioners, and the 47 competency responses would provide extensive information about graduates' curriculum-related skills. Both instruments used identical Likert-like scales (as recommended by Paul & Bracken, 1995) for assessing perceived ability in each competency. The assessment levels were 'weak,' 'adequate,' and 'very good' with a 'not observed' or 'not practiced' response if the competency did not apply to an individual clinic. Likert scale instruments have been used in other studies to assess practitioners' opinions of veterinary medical education (Stone et al., 1992), attitudes about changes in the veterinary profession (Frazier & Howell, 1991; Wyman & Hudson, 1989), and veterinary graduates' competency (Weigel, Rohrbach, Monroe, & Warner, 1992). Each instrument included check items for demographic information and one open response item to elicit ideas and criticism as suggested by Weigel, Rohrbach, Monroe, and Warner (1992).

The CDC reviewed drafts of the proficiency instruments and suggested improvements in the analyst's use of nomenclature. For example, a member objected to the analyst's use of 'sales' as a management proficiency, saying, "Veterinarians deliver services ... we don't have sales." The analyst realized that practitioners and academicians interpret words differently, as might workers and decision makers. Another member questioned the usefulness of proficiency statements involving ethics and continuing education because those criteria could not be taught in the classroom. The analyst modified unclear proficiency statements to reflect CDC members' suggested wording.

In Event #4, preliminary versions of the proficiency review instruments, letters of instruction, and worksheets for assessing the instruments were mailed to 10 practitioners as a pilot test. The CDC assisted the analyst in pilot testing the instruments by providing the names of 10 veterinarians who operated private practices and were thought to be supportive of veterinary curriculum improvement. The veterinarians were asked to peruse a cover letter and a trial proficiency instrument, complete a pilot

evaluation worksheet, and write comments about any difficulties they experienced in understanding the instructions or proficiency assessment items. Six veterinarians returned usable evaluations. A tabulation of those evaluations indicated (a) it was clear that the instrument's purpose was to assess the College's DVM curriculum by looking at graduates' proficiencies (5 of the 6 responses), (b) the instructions were understandable (6 of 6), (c) practitioners would not be at risk by divulging competency information (5 of 6), (d) the three-level rating scale was adequate for assessing graduates' proficiency (5 of 6), (e) the items were relevant to veterinary medicine (5 of 6), and the proficiency items were not considered obtrusive (4 of 6). The CDC examined the returned instruments and discussed the reviewers' suggestions. For example, one pilot reviewer noted that 'enzymology' was unclear. Some CDC members did not agree, saying the term was common to every textbook. The CDC members thought the pilot test was worthwhile, and they reached consensus about changes in nomenclature. The analyst was asked to make the agreed changes in wording and proceed with mailing the survey.

In Event #5, the final versions of the instructions and proficiency review instruments along with an introductory letter from the Dean were bundled into packets and mailed to the selected graduates and employers. Separate letters of explanation were written to address the graduate and employer populations. The letter of explanation informed the practitioner of the needs assessment's purpose and also informed him or her that (a) participation was voluntary, (b) the responses would be read by no one other than the analyst, (c) the analyst could not identify the respondents by their responses, (d) proficiency findings would be reported as group data, and (e) the proficiency review instrument should be returned within two weeks. A telephone number within the College was included so subjects could speak to someone if they had questions about the project. These notations were required by the University's Institutional Review Board. Examples of the research packet materials are included in Appendix C.

Each packet included a business reply envelope for returning the completed proficiency instrument. The envelopes were printed with a mail drop address in the College and were numbered on the outside. The numbers corresponded to practitioners' names on the mailing lists so an administrative assistant could mail a follow-up packet to a subject if no reply had been received after 18 days. The administrative assistant, who was not involved in the curriculum review or case study, was instructed to note the numbers on returned envelopes, check them on the graduate or employer mailing list, collect the instruments for the researcher, and destroy the envelopes.

The analyst selected names of graduates and employers for the mailing list to receive the proficiency instruments, and the proficiency review packets were mailed. Purposive sampling was used to generate the mailing list. Graduates were chosen on the basis of species emphasis, gender, and geographic region. Appendix H, part 1 contains a table illustrating the survey distribution.

Three hundred fifty-five packets were mailed on March 11, 1996. Packets were mailed to 146 graduates and 209 employers. Eighteen days after the initial mailing, a second packet was mailed to each practitioner who had not returned the instrument. The response was anticipated to be 50% based on other veterinary studies that had used multiple-page instruments and had experienced 48% to 56% response; e.g., Frazier & Howell (1991); Pelzer & Leysen (1991); Stone et al. (1992); Wimberley (1991); Wyman & Hudson (1989).

Events #6 through #14: Gathering, Reducing, and Displaying the Needs Assessment Data

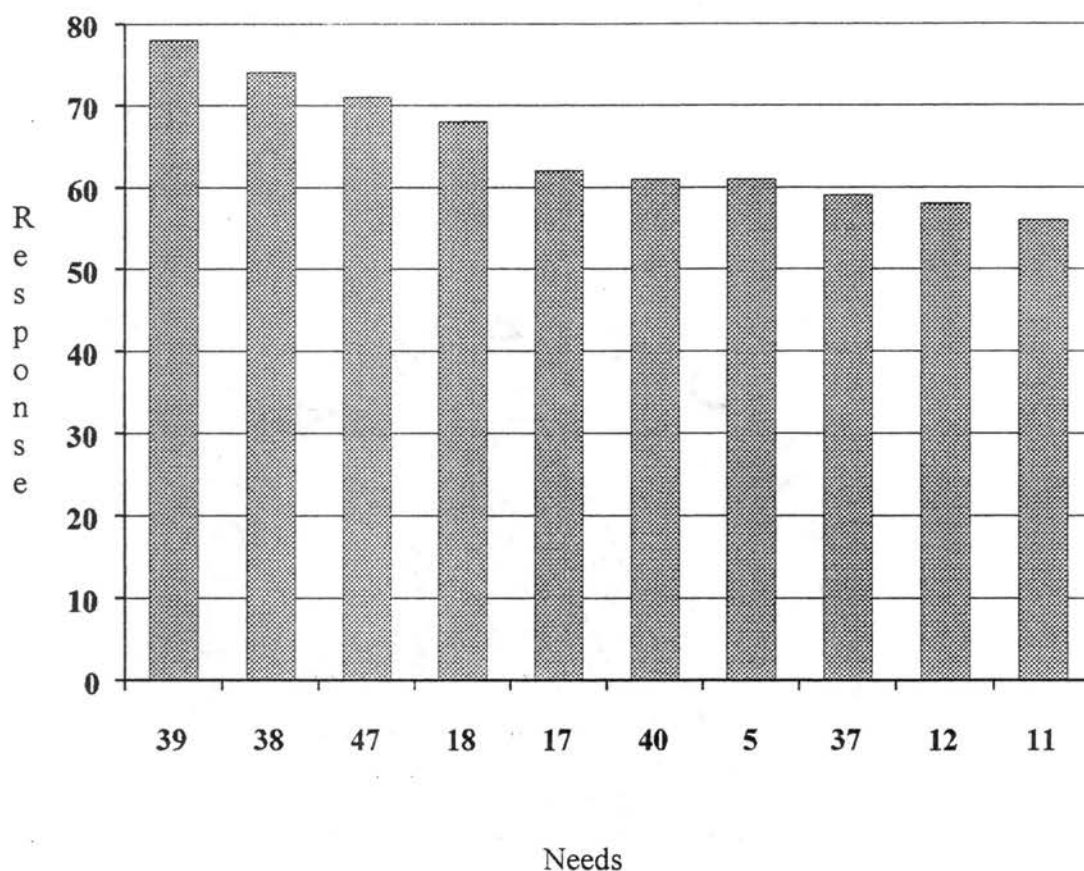
In Event #6, the returned proficiency review instruments were analyzed. Ninety-seven graduates returned useable instruments (a 66% response). One hundred thirty-four employers returned instruments, and one hundred thirty-three instruments were useable (a 64% response). The one returned instrument not used in the study included a respondent-created rating scale. As completed proficiency review instruments were

returned, the administrative assistant who helped with the survey kept a confidential list of respondents so they could be provided a report of the findings and curriculum changes.

Analyzing the survey involved tabulating competency ratings and coding practitioners' comments by area of discipline for the two practitioner groups. The findings were displayed using Pareto distributions. Together, the tabulations and displays reduced the data and prepared the findings for reporting to the College's decision makers. Tabulation of the proficiency review data revealed two common patterns. First, graduates rated their abilities as very good while employers rated the same criteria as adequate (15 proficiencies). Second, graduates and employers were in agreement about graduates' proficiency with adequate as the median rating (26 proficiencies). Overall, graduates were confident of their skills in veterinary medicine, rating themselves as very good or adequate (more often than weak) in 45 proficiencies. Employers rated graduates as very good or adequate (more often than weak) in 43 proficiencies. The tabulated data are displayed in Appendix H, part 2.

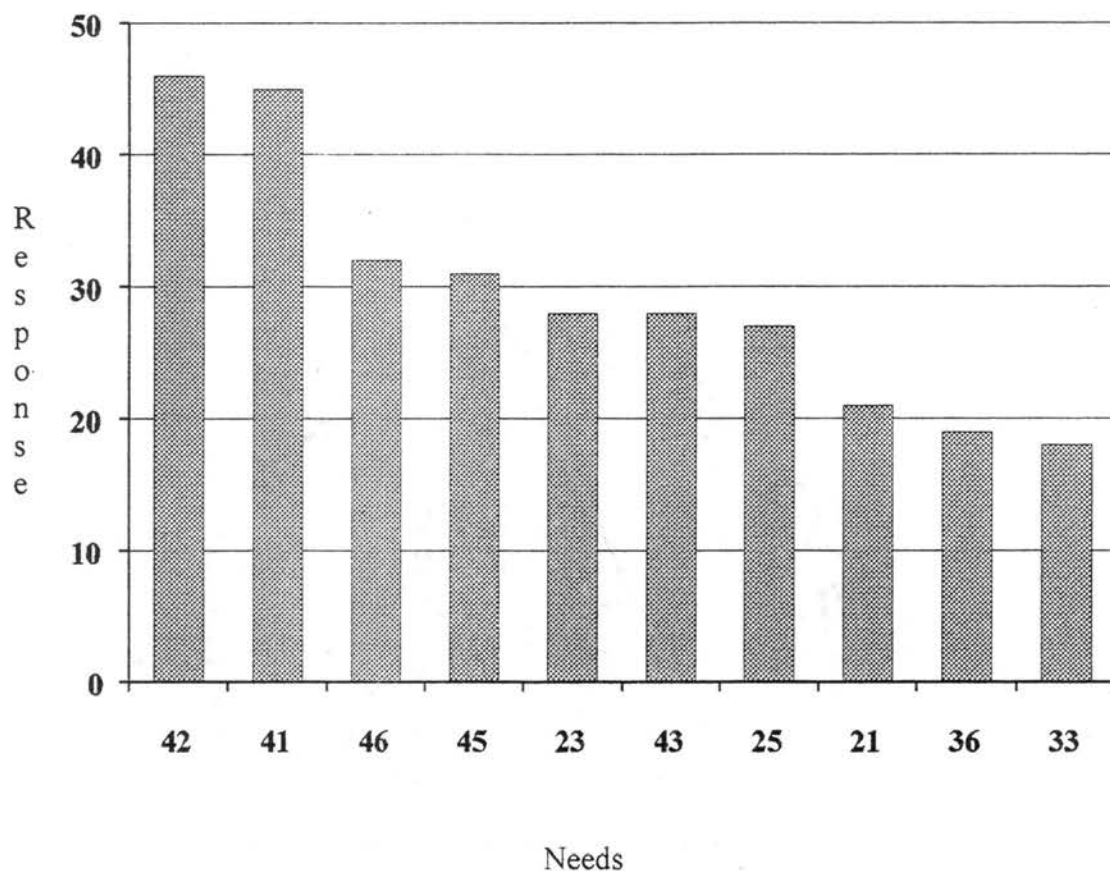
The proficiencies that graduates most often reported as very good included work and professional ethics, continuing education, clinical examinations, applying information from medical journals, client relations, and parasite control. The proficiencies that graduates most often reported as weak were use of medical software and databases, aspects of business management, laboratory testing, and pharmacology.

Four graduate strengths reported most often by employers were professional and work ethics, continuing education, utilizing published information, and parasitology. Other strengths included employee relations, and clinical examinations. Proficiencies most often rated weak by employers included business knowledge, informing clients, surgical techniques, writing skills, and pharmacology. Figures 1, 2, 3, and 4 show the respective Pareto distributions of graduates' and employers' ratings.



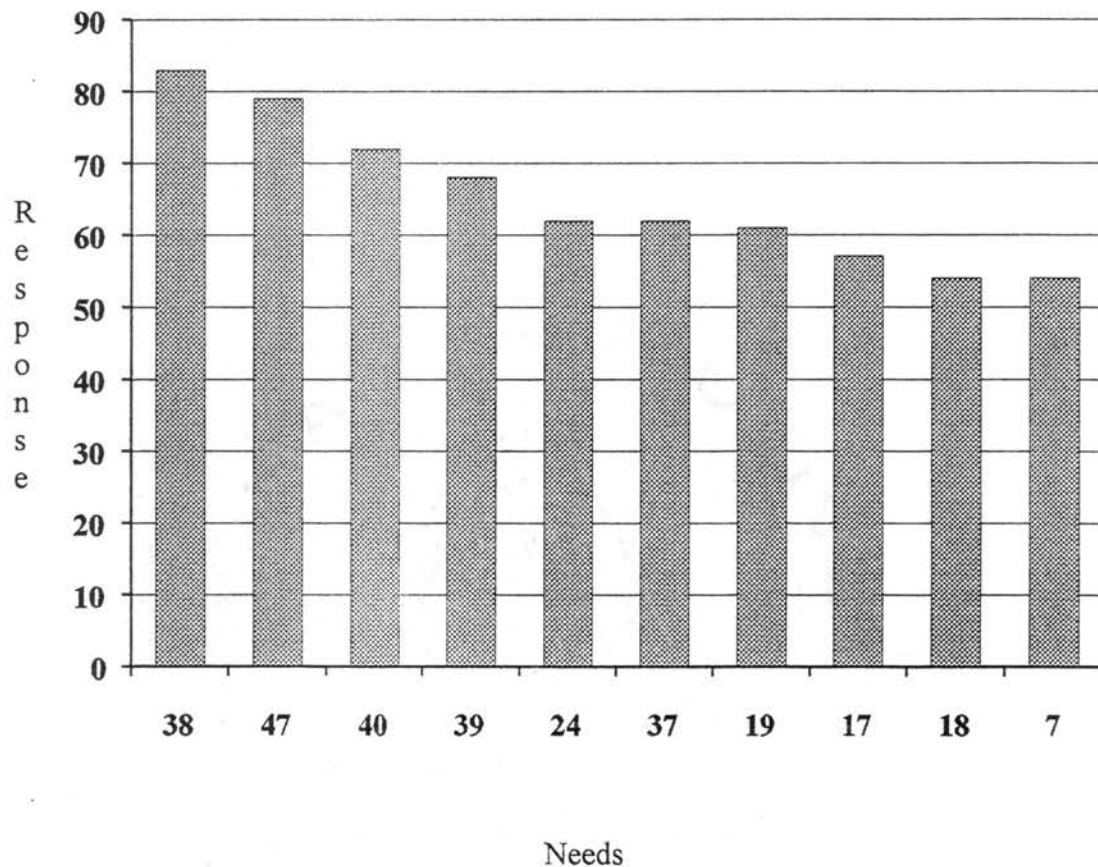
Note. Numbers on the ordinate refer to competency items with the greatest amount of 'very good' ratings from the graduate proficiency review instruments: 39 = work ethic; 38 = professional ethics; 47 = continuing education; 18 = examinations (signalment); 17 = examinations (patient history); 40 = applying information from books/journals; 5 = informing clients (treatment); 37 = relationship with coworkers or professionals; 12 = disease prevention (parasites); 11 = disease prevention (vaccines). The abscissa is scaled to display the amount of 'very good' responses for each competency.

Figure 1. Graduates' Reported Strengths



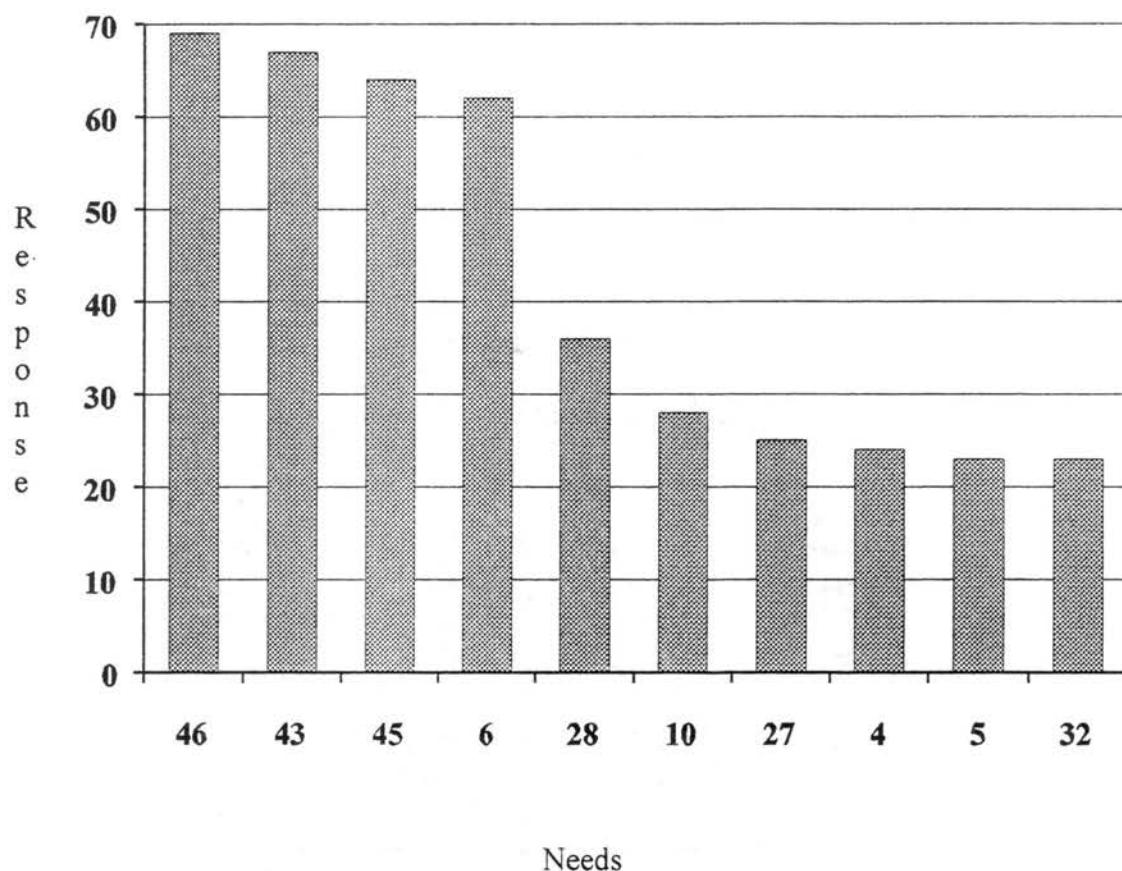
Note. Numbers on the ordinate refer to competency items with the greatest amount of 'weak' ratings from the graduate proficiency review instruments: 42 = applying information (medical software); 41 = applying information (electronic databases); 46 = business management (profitability); 45 = business management (billing for materials used); 23 = laboratory tests (toxicology); 43 = business management (cost awareness); 25 = laboratory tests (microbiology); 21 = laboratory tests (enzymology); 36 = fit between species emphasis at CVM and practice type; 33 = pharmacology (legal use). The abscissa is scaled to display the amount of 'weak' responses for each competency.

Figure 2. Graduates' Reported Weaknesses



Note. Numbers on the ordinate refer to competency items with the greatest amount of 'very good' ratings from the employer proficiency review instruments: 38 = professional ethics; 47 = continuing education; 40 = applying information from books/journals; 39 = work ethic; 24 = laboratory tests (parasitology); 37 = relationship with coworkers and professionals; 19 = examination (physical); 17 = examinations (patient history); 18 = examinations (signalment); 7 = customer relations. The abscissa is scaled to display the amount of 'very good' responses for each competency.

Figure 3. Graduates' Strengths Reported by Employers



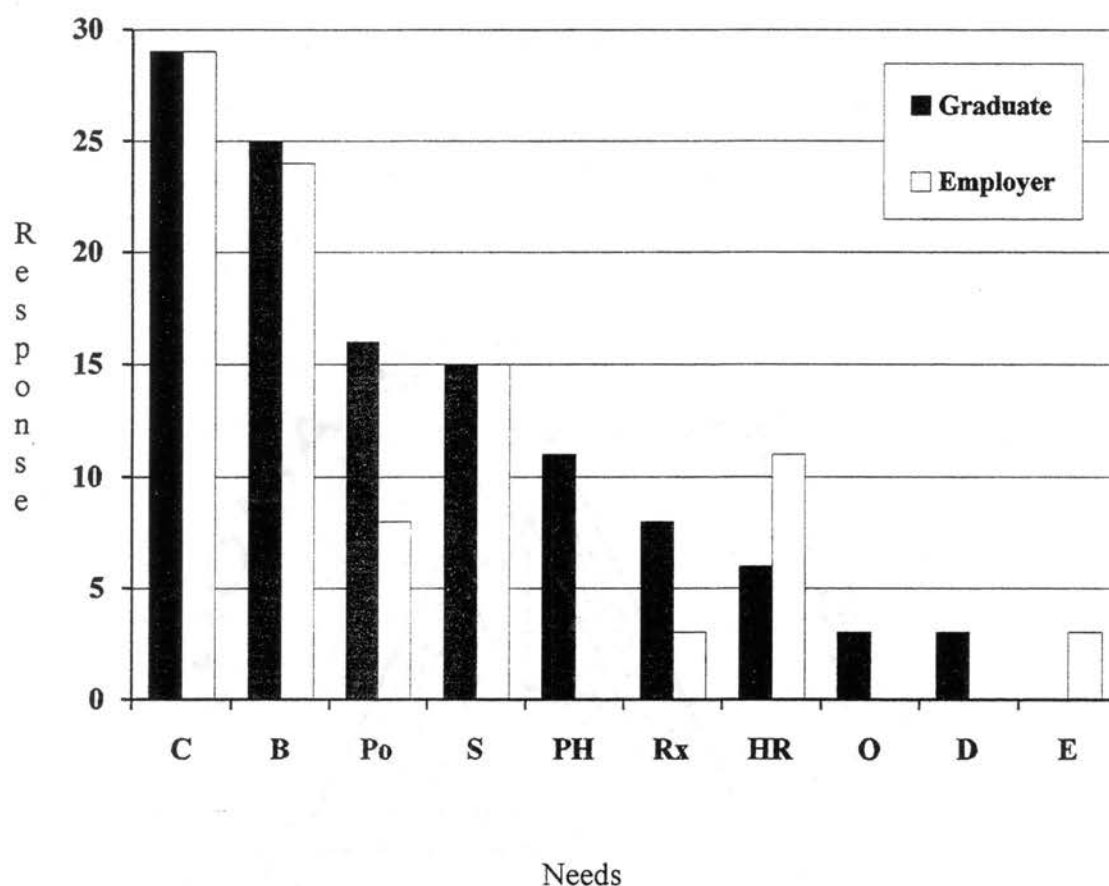
Note. Numbers on the ordinate refer to competency items with the greatest amount of 'weak' ratings from the employer proficiency review instruments: 46 = business management (profitability); 43 = business management (cost awareness); 45 = business management (billing for materials); 6 = informing clients of costs; 28 = common surgical techniques; 10 = communication (writing); 27 = laboratory tests (diagnostic imaging); 4 = informing clients (condition and outcome); 5 = informing clients (treatment options); 32 = pharmacology (selection of agents). The abscissa is scaled to display the amount of 'weak' responses for each competency.

Figure 4. Graduates' Weaknesses Reported by Employers

One open response item was common to both graduates' and employers' instruments, an item to elicit ideas and criticism about the curriculum. Responses to this item were provided by 80 graduates and 94 employers. The analyst transcribed the responses verbatim. Because the responses were anonymous, the praise, criticism, and suggestions were included in the written needs assessment report presented to the College. Analysis of the open item responses involved coding the needs by area of academic discipline within the curriculum (e.g., surgery and pharmacology) and displaying the findings. The distribution of needs by area of discipline is illustrated in Figure 5. Graduates' suggestions for strengthening the curriculum were mostly consistent with employers' expectations of the DVM program (e.g., clinical techniques, business management, and surgery). However, one topic, human relations, was mentioned for student improvement in some of the written responses but was an area of strength in the proficiency ratings. The difference in appraisals of that competency reflects the feelings of different employers.

When the item 'years in practice' was used to compare responses, graduates out of school five years rated themselves as very good more often than groups from other years. No changes occurred in the curriculum or faculty during the study period, so this finding can indicate that the most senior graduates had enhanced their academic knowledge with knowledge gained through practice. Because there were fewer responses from the 1991 graduates than from the other groups, the finding also can mean that graduates' interest in improving the curriculum diminished through time.

In Event #7, the analyst reviewed the preceptorship reports, the extant records, to gather information about the proficiency characteristics of the graduates (as students) and the characteristics of practicing employers and workplaces. The analyst read 536 reports, made written notes of words or stories that identified student knowledge, capabilities, and motives and employer characteristics, and summarized the notes on the Extant Data Worksheet (contained in Appendix H, part 3). All preceptees wrote of



Note. Letters on the ordinate refer to needs expressed as comments on graduate and employer proficiency review instruments. The needs correspond to areas in the DVM curriculum: C = clinical and medical techniques; B = business management; Po = policies of the College; S = surgery techniques and practice; PH = public health (epidemiology, immunology, and vaccinations); Rx = pharmacology; HR = human relations; O = ophthalmology; D = dermatology; E = professional and work ethics. The abscissa reflects the amount of responses for each expressed need.

Figure 5. Distribution of Needs from Practitioners' Comments

being motivated and as fully involved in animal care as their hosts permitted. Some students felt the curriculum had prepared them for the preceptorship, while others stated they needed more clinical and surgery experience to feel confident. About one-third of the reports faulted the host's preceptorship offer for having no formal agenda or for using them as technicians and clerks. There was little opportunity for performance change in those cases. None of the reports expressed disappointment with the College's curriculum as a result of their preceptorship experience. The extant records of students' perceptions supported information uncovered in the graduate proficiency reviews: The College's graduates reported having (a) a strong work ethic, (b) a high regard for ethical conduct, (c) a strong desire for continued learning, and (d) confidence performing clinical examinations. The extant data also supported employers' recommendations that the curriculum be strengthened in surgical opportunities and workaday medical knowledge.

In Event #8, the analyst filled in as much of PAT worksheet Steps Three through Seven as he could answer. Actions in Steps Four through Seven that required information from participant observation, teaching faculty interviews, and organization culture interviews were deferred until Event #15 when such data were available.

In Event #9, the analyst presented the needs assessment findings to the CDC, and the final project report to the College Dean, Associate Dean and CDC. The findings reported to the CDC included analyses of the extant records and the returned proficiency review instruments. Because the CDC had been eager to use the proficiency review findings in revising the curriculum, the analyst gave a verbal presentation of interim findings on April 23, 1996. A written report on the completed needs assessment was given to the Dean, Associate Dean, and CDC Chair on July 1, 1996. The objective of the needs assessment—to obtain documented information about deficiencies in the DVM curriculum—was answered through analysis of the proficiency reviews and extant records. The findings of the proficiency review indicated that the existing curriculum

had some deficiencies: clinical and surgery practice, business management, and client communication. Overall, graduates exhibited more strengths than deficiencies, and no more than eight of the 133 employer respondents indicated dissatisfaction with the College's graduates. The report concluded that a majority of graduates were satisfied with the veterinary education they received, and the majority of responding employers indicated they were pleased to have hired one of the College's graduates.

The results section of the needs assessment report given to the College is included in Appendix H, part 4. The findings were in agreement with curriculum evaluations at other veterinary colleges. Weigel, Rohrbach, Monroe, and Warner (1992) reported that recent graduates of the University of Tennessee and their employers were satisfied with entry level performance. Employers rated those graduates to be competent in clinical medicine, information retrieval, and tissue surgery; however, like the College's graduates, the Tennessee graduates were seen by employers as deficient in management, client relations, orthopedic surgery, cost awareness, and writing skills. Stone et al. (1992) found that more than 60% of recent U.S. veterinary graduates who responded to a survey rated themselves 'good' or 'excellent' in diagnostics, lifelong learning, ethics, and client relations and 'weak' in communications skills and cost awareness. Other surveys have made veterinary educators aware that employers want graduates to have business and information management skills (see Frazier & Howell, 1991; MacNeil, Algermissen, & Neill, 1985; Myers & Taylor, 1996). The areas of strength and deficiency in the studies were similar to those identified in the needs assessment.

In Event #10, the analyst observed the CDC as it discussed the needs assessment findings, reviewed the existing curriculum, and designed a new curriculum. The analyst noted the biases, concerns, and rhetoric expressed by the decision makers. Aspects of the participant observation are described below.

Outcomes of the curriculum revision sessions. Based on the information that they had, the CDC members designed a curriculum that combined the strengths of the College's existing disciplines; the best features of other veterinary schools' curricula; and the expressed needs of students, faculty, and graduates. The proposed curriculum exhibited six important changes. First, credit hours for the first three years of the program were reduced by eight percent. This reduction met the AVMA accreditation requirement for a shorter program. Second, statistics and nutrition courses were moved from the first year to the preveterinary plan of study. Third, classroom hours in the core disciplines were reduced by integrating medicine, surgery, and pathology into anatomical systems courses. Fourth, the integrated systems courses eliminated redundant knowledge from the curriculum. Fifth, elective courses were added to the second year of the program, the number of third year elective courses was increased, and opportunities for species emphasis in the fourth year was increased. Finally, clinical rotations were designed to develop a sense of employee relations by combining third and fourth year students with cases requiring team working. The latter four changes coincided with suggestions made by graduates.

In August, 1996 the CDC finished designing the proposed curriculum and distributed copies of the needs assessment report and the curriculum by computer network to the College's faculty for review and comment. The faculty were allowed six weeks to reflect upon the proposed curriculum before ballots were distributed for a faculty vote. The recommended changes raised objections from some faculty in the basic and clinical sciences. Voting was conducted in October after the CDC listened to faculty concerns and made course adjustments. Sixty-three percent of the faculty voted to accept the proposed curriculum. The new curriculum was scheduled to begin in 1998, time enough for the respective departments to design new courses.

The analyst's observation. The observation began December 1, 1995 with an invitation from the CDC and continued through August 21, 1995 when the CDC

released its proposed curriculum to the faculty. The analyst attended 18 sessions of the CDC during the nine-month period. He participated with CDC members as they discussed the parameters of the needs assessment and the design of the proficiency instruments (Event #2); he presented the needs assessment findings from graduates and employers (Event #9); and he observed the members discuss opportunities and problems in a new DVM curriculum, review the existing curriculum, and develop the proposed curriculum (Event #10). The following are highlights of the observation notes.

Because the CDC was charged with the responsibility of developing a revised curriculum, it was not unusual that these decision makers were active in the resolution of curricular needs. The analyst was surprised at some of the happenings, and he made four inferences. First, the vernacular of the customer, the graduates and the employers, was different from that of the decision makers. That difference may have prevented some customers' expressed needs—such as the request for more training in common practice medicine and surgery—from being considered at the time of the curriculum review. Also, differences in jargon between CDC members and the analyst may have influenced the presentation of the needs assessment findings or acceptance of the analyst's conclusions in the needs assessment report.

Second, implementing the PAT model inspired the decision makers to gather their own data from students. Early in the curriculum review the CDC conducted a series of focus groups involving a cross section of the College's students. The CDC's intent was to recognize students as well as faculty and practitioners in the curriculum revision. The analyst had asked the Associate Dean at the start of the project if the CDC had wished to include students in the needs assessment, and the Associate Dean replied that the CDC was interested in learning practitioners' evaluation of the curriculum. No discussion of gathering data from students arose in the needs assessment planning sessions. However, reflection on the PAT model's inclusive nature could have induced the CDC to consider students' needs and gather the information independently.

Third, the decision makers were more enthusiastic about the data they gathered than the findings that the analyst gathered for them. The analyst observed instances in the curriculum revision process where CDC members spoke with conviction of changes that students had suggested. Fourth, the analyst noted that the College's Dean had remained aloof from the development of the new curriculum although he had charged the CDC with the task and had pressed the Chair for early completion. Near the completion of the curriculum revision the Chair remarked, "There is the need for a strong sales pitch by the Dean for academic support." The Associate Dean replied that the Dean "wishes to remain neutral until after the voting is done." The Synopsis of Observation is contained in Appendix I.

In Event #11, after the CDC had distributed the needs assessment findings and the proposed curriculum for all faculty to consider, the analyst interviewed seven teaching faculty to get their perspectives on the organization, the customer, and the curriculum. The CDC suggested seven instructors who, in their opinion, had differing views (either in support or in dissent) of the proposed curriculum changes. The analyst contacted the instructors by telephone to introduce them to the needs assessment and request the interview.

Structured interviewing, recommended by Witkin (1984), allowed the analyst to gather information in a uniform way from all interviewees. Four basic sciences faculty and three clinical faculty were interviewed about the goals of the program, awareness of curriculum needs, graduates' proficiency, practitioners' complaints, their feelings about the proposed curriculum, and their recommendations.

The faculty interviews revealed four principal characteristics of the organization element. First, although the College had published objectives for its being, it had established no goal for the DVM program. One instructor remarked, "That's one issue we've been trying to agree on since I came here I think our goal is to graduate a competent person who is qualified to go into private practice at entry level." The

collective view among instructors (four of the seven interviewees and most of the CDC members) was that the curriculum should prepare students for a wide variety of veterinary practices including teaching and research. For example, one instructor commented, "I firmly believe it is more important to give them a solid foundation than technical skills," and another said, "The job of the faculty is to recognize the few who function well in academia."

Second, the four interviewees from the basic sciences reported almost no contact with practitioners, and little contact with the clinical faculty. One noted, "There is a division between the basic and clinical sciences. Clinical faculty look at individual application of the information that we [basic sciences] generate Few of us have substantial interaction with them [clinicians]. Those guys say we don't prepare students." Third, the faculty were divided in their philosophy of teaching. The basic sciences instructors taught biological knowledge in a didactic fashion while the clinical instructors taught applied medicine using teams and action research. An instructor illustrated the point: "We aren't trained to teach; it is assumed that someone with this much education can teach Most faculty don't think its relevant to get such education on their own." Another said, "There are two groups of faculty, those with less than 10 years of teaching experience and older faculty with older success methods. Problem based learning is hard for the older faculty, and many of the professors who use problem-based learning are popular with students."

Finally, those faculty who stated approval of the proposed curriculum recognized that it was not optimal, but they were eager to see change occur. One instructor said, "It's a compromise. The proposed curriculum is good, but with a didactic curriculum you still have the problem of memorizing for the test questions." Those who opposed the new curriculum stated concerns about the proposal's learning concept and the demands it could place upon their time. For example, "I don't like the curriculum we have now, but we do build upon previous learning Design the program with

practitioners; ask them, 'What do you really need?' " Another said, "this [curriculum] requires a commitment of time, and the resources here may not permit it. It's hard for me to get free of the clinic for short instruction periods." The complete faculty interview findings are included in Appendix J.

In Event #12, three additional faculty were interviewed to learn about the organization's culture to ensure that the analyst had viewed the College's system and the characteristics of the organization elements accurately. The analyst selected an administrator, an instructor in the basic sciences, and an instructor in the clinical sciences. The interview script was based on Shapiro and Schall's (1990) suggested questions for uncovering an organization's culture and rhetoric. The complete list of organization culture interview questions is contained in Appendix E, part 2. The responses from these insiders provided information about how things got done in the College. The analyst was surprised by the uniformity of the responses when the basic and clinical sciences instructors ordinarily had little contact with each other and held different views of the purpose of veterinary education. The people to impress were the Dean, the Hospital Director, and one's department head. Achievers stood out by (a) furthering the College's goals through participation, (b) being proficient in one's emphasis area, and (c) helping colleagues with their work. The rewards were primarily intrinsic: the esteem of one's peers and the satisfaction of being part of the profession's knowledge base. Extrinsic rewards were professional recognition, tenure, involvement, and salary increases. The best path to recognition was a recommendation of one's leadership or competency from an influential faculty. Humor and sincerity were key affective characteristics while competency and collegiality were important behavioral characteristics. Notes from the organization culture interviews are summarized in the Synopsis of Organization Culture contained in Appendix K.

In Event #13, a brief report of the findings of the needs assessment and the actions taken to revise the curriculum was mailed to each practitioner who returned a

proficiency review instrument. The final task in the needs assessment, one which was not part of the original PAT model, was to inform customers of the outcome of the project. The Associate Dean agreed with the analyst's suggestion that stakeholders who participated in the needs assessment should be informed of planned improvements in the DVM program. He said, "For public relations and the participation of alumni, we should document that the College is making progress in its curriculum review through the needs assessment. We did listen to them, and here is what we are doing to change." The analyst wrote a summary of the needs assessment findings and the curriculum revisions. The summary and a cover letter from the Dean thanking practitioners for their support was mailed to the 230 survey respondents on November 4, 1996. Event #13 occurred late in the case study, after the new curriculum was approved by faculty vote.

In Event #14, the analyst reduced the observation, faculty interview, extant records, and organization culture data to synopses and reviewed the results. The information providers were asked to read and verify the accuracy of the findings using worksheets designed for the task. In reducing the data, three deviations from the PAT procedure (listed in Appendix A, part 1) occurred. The first deviation was the use of data synopses. The analyst found that answering the PAT worksheet actions directly from the many pieces of data was difficult. He simplified the task by summarizing the data from each investigation (survey, extant records, observation, and interviews) in a synopsis. The analyst used the information from the synopses to complete the worksheet actions.

The second deviation occurred in working with the PAT worksheets. The analyst attempted to answer Steps One through Four while the needs assessment was in process, but was discouraged by insufficient information; instead, he used an iterative approach. This involved frequently reviewing previous responses to worksheet actions and expanding or recasting them when additional data or insight was received. For example,

the culture interviews provided insight into the motive and meaning of instructors' interview responses, and the faculty interviews afforded an understanding of some of the curriculum issues discussed in the CDC sessions.

The third deviation involved gathering additional data after the needs assessment report had been completed. The analyst designed the study to collect observation and interview data after the needs were known and while the curriculum was being revised. This process allowed him to answer the research questions concerning the use of needs assessment findings and the involvement of the decision makers, and it revealed aspects of the PAT model applied in a setting other than business.

Because the summarized data could be inaccurate, reflecting the analyst's biases, one or more information sources reviewed the respective synopses and assessed the analyst's report of the situation. Miles and Huberman (1984) recommended using multiple sources of data from different points in time or place to verify the accuracy of data reduction and data display. The sources used in this study included the seven faculty interviewees, the Director of Preceptorship Programs, and the Associate Dean.

Each of the seven faculty interviewees read and edited a transcript of his or her interview. The interviewees made no significant changes in the content of the transcripts. The Director of Preceptorship Programs read the completed Extant Data Worksheet and marked two assessments on the five-level Likert-like scales on the Extant Data Verification Worksheet. The Director rated the description of student clinicians as 5.0, (or, very accurate), and the description of employers and the work environment as 4.0 (or, moderately accurate).

The analyst selected the Associate Dean to review the Synopsis of Organization Culture. The Associate Dean had broad knowledge of veterinary medicine, was an ex-officio member of the CDC, had worked ten years with the College and faculty, and had experienced curriculum revision at another veterinary College. He rated the analyst's understanding of the College's culture, rhetoric, politics, and system as 5.0 (that

is, very accurate), using the five-level Likert-like scale on the Observation and Culture Worksheet. Additionally, the Associate Dean reviewed the Synopsis of Observation. He rated the analyst's interpretation of the CDC's actions, characterization, and involvement in the needs assessment as 5.0 (or very accurate) on the Observation and Culture Worksheet. He answered the worksheet's open response item by writing, "I was very impressed with the ability of a stranger to grasp the essential nature of our culture and behavior We should expose ourselves to outside evaluation more often."

The respondent validations affirmed that the analyst's perceptions of the College, the decision makers, and the customers were similar to those of organization insiders. Accurate perceptions were important because the synopses served as information sources for completing the PAT worksheets and for answering the research questions.

Events #15 through #17: The Three-Stage Data Analysis and Evaluation Process Used to Answer the Research Questions

The final three events involved a process of considering the research questions relative to the data that had been collected during the first 14 events. This three-stage process involved the triangulation of multiple perspectives to examine the data and answer the research questions. First, the analyst reviewed the case study notes and addressed the research questions. Second, CDC members evaluated the needs assessment outcomes. Third, an independent reviewer evaluated the results of adapting the PAT model to an education setting. Events #15, #16, and #17 pertain to these stages.

In Event #15, the analyst used information from the synopses to complete the unanswered actions in worksheet Steps Four through Seven and to update initial entries in Steps One through Three. The analyst formed his conclusions to the research questions after the data were reduced and displayed. He used the PAT worksheets and the needs assessment report to review the case study findings and answer the research questions. In this situation the PAT worksheets were instruments for data analysis, the

second part of Miles and Huberman's (1984) deductive research process. The completed PAT worksheets (included in Appendix L) were typed to conserve pages. The analyst reviewed the case study documentation and identified evidence in the body of data relative to each research question. The following sections describe the information that the analyst used in answering each research question and subquestion.

Question 1. How useful was the modified PAT model for determining deficiencies in a professional curriculum offered at one institution of higher education?

The modified PAT model was determined useful for discovering deficiencies in a professional curriculum. The modified model allowed for customization of the needs assessment process. In this case, the process involved a survey of graduates' perceptions of curriculum strengths and deficiencies, a survey of employers' perceptions of graduates' strengths and deficiencies, and a review of extant documents. The modified PAT model provided the analyst with a defined process for determining curriculum needs by addressing the organization's stakeholders. Further, the information gained in the needs assessment process was useable in revising the DVM curriculum.

In answering this research question, the analyst made four discoveries concerning the PAT model. First, the data gathering order could deviate from the established procedure without seeming to unduly influence the outcomes of the model. In this case study, the data gathering was continued after the curriculum needs assessment report had been submitted to the College. For example, interviewing faculty to understand their perspectives and the organization culture was performed near the end of the case study (when the analyst had become known to the interviewees) and not at the beginning as ordinarily would have been done to answer worksheet Steps One and Two (A). Second, gathering data out of sequence obligated the analyst to read his earlier worksheet responses and update them with new information and understandings. Third, some actions included in the PAT worksheets were not used in this needs assessment.

In particular, the actions of Step Five, "determine the cause of performance issues" and "determine solution alternatives," were disregarded because (a) causation was not part of the needs assessment based on the definition used in this study and (b) solutions determination was the CDC's goal and responsibility. The fourth discovery was that some PAT worksheet actions did not fit the education setting and had to be modified slightly; the analyst found it helpful to modify the worksheet actions to reflect the case study's focus. For example, 'opportunities' was changed to 'needs' in Steps One and Five, 'training' was changed to 'curriculum revision' in Steps Two (A) and Six, and 'bottom line' was changed to 'goals' in Step One. The original PAT worksheets were designed for internal performance measures in business and cannot be optimal for all other applications.

Question 1a. How useful was the inclusion of customers in the curriculum needs assessment? Customers played an important role in the needs assessment by providing primary data on the strengths and deficiencies of proficiencies linked to the curriculum. The College had never before documented graduates' or employers' satisfaction with the program, and that information was needed by the CDC for revising the curriculum. Without customer feedback, the CDC might have polled the faculty and relied upon instructors' intuition, hearsay, or appraisal of past students to describe the usefulness of the existing program. Based on observation, interviews, and survey data, the analyst concluded that adding customers to the PAT model was useful to the needs assessment.

Question 1b. How useful were the needs assessment findings for making changes in the veterinary curriculum? The proficiency instruments were designed to allow graduates and their employers to rate proficiencies and solicit suggestions for improving the curriculum. The ratings gave the CDC members a feel for how well the graduates assessed their current proficiencies relative to specific items in the College's disciplines. The comments indicated graduates' likes and dislikes about the program and suggestions for improvements. The CDC looked over the ratings and comments and discussed them

with the analyst, but was not observed to use the information in the revision process.

The Chair explained that the Dean wanted the proposed curriculum completed before the start of a new school year—seven months for the needs assessment and the curriculum revision processes. Thus, the committee was focused on designing a curriculum frame; the ratings were a resource for instructors to use in designing course syllabi.

Observation of the curriculum revision sessions did not indicate that the proficiency ratings and practitioners' comments moved CDC members to design a new curriculum with features based on practitioner suggestions. Therefore, the modified PAT model was successful in guiding a needs assessment that produced the information that CDC had requested; however, the CDC made little use of the information, so the needs assessment findings contributed only slightly to changes in the veterinary curriculum.

Question 2. To what extent were the results of the needs assessment influenced by the characteristics of the model's four elements? The outcome of the needs assessment was a documented description of the strengths and deficiencies of the curriculum as defined by the ratings and comments of practitioners. The four elements of the modified PAT model each played a part in the needs assessment process and in the results. The customer exhibited the largest influence on the findings in the needs assessment report because it was customers' collective appraisal that defined the proficiency of graduates. Graduates' self-confidence in their diagnostic and treatment skills and employers' praise of graduates' professional ethics gave the program a favorable image. Employers' concerns about medical and management knowledge reflected proprietors' need to be competitive, provide quality service, and earn profits.

The analyst's objectivist approach to research contributed to the process and outcome through the design of the instruments, the selection of practitioners, and the presentation of needs assessment findings to the CDC.

The decision makers' (i.e., the CDC) characteristics influenced the process and outcome by determining which proficiencies from the basic and clinical sciences

disciplines would be involved in the proficiency review. Also, the CDC influenced the outcomes of the needs assessment by deciding how to use the needs assessment results in revising the curriculum.

The organization element included faculty who were not members of the CDC, yet provided an impetus for the needs assessment. Because these faculty had voting power on the proposed curriculum and little contact with practitioners, the CDC wanted the needs assessment findings to identify and justify curriculum changes to those faculty. The non-CDC faculty had little influence on the needs assessment process but significant influence on the curriculum revision. One organization member who did influence the needs assessment outcome was the Dean. His cover letters, which were addressed to participants individually, may have been responsible for the favorable response by graduates. Thus, the analyst discovered that the salient organization characteristics included members with differences in political agendas, values, sources of organizational power, and willingness to change the curriculum. At various times throughout the needs assessment process, different individuals and groups of professionals from the decision makers and the organization members, along with the analyst, met to discuss differences and figure out how things should work in the College. Those actions embraced the College's culture, rhetoric, politics, and instructional system, and influenced the process and results of the needs assessment.

Question 2a. To what extent did using the PAT model involve the institution's decision makers in the needs assessment process? The process of implementing the PAT model provided multiple opportunities for CDC involvement. First, the CDC determined who should be defined as customers in the needs assessment. Second, the CDC agreed with the analyst that a survey was the most economical method of collecting data from a sample of the customers. Third, the CDC spent several sessions deliberating the balance between clinical skill and biological knowledge before compiling the proficiencies used in the survey. Fourth, the CDC developed a list of 10 practitioners to pilot test the

proficiency review instruments. Later, they discussed the suggestions made by those practitioners. Fifth, the CDC reviewed the two finished instruments and declared them ready for mailing. Sixth, during the time the analyst was collecting data, the CDC also gathered information by organizing student focus groups to discuss the existing curriculum. Finally, the CDC questioned the analyst about the findings during the interim presentation of the needs assessment data. Based on those events, the analyst determined that the modified PAT model did involve the curriculum decision makers in the needs assessment.

In Event #16, the second stage of answering the research questions and subquestions, members of the CDC evaluated the needs assessment using Curriculum Committee Evaluation Worksheets. This event involved the College's experts in veterinary curriculum, the CDC. Each of the nine CDC members was asked to appraise the outcome of the needs assessment using a Curriculum Committee Evaluation Worksheet (see example, Appendix G, part 1). The appraisals were based on CDC members' satisfaction with the needs assessment process and results. The worksheet included six assessment items, four of which were based on the research questions (specifically, numbers 1, 1a, 1b, and 2a). Research question 2 was omitted because the analyst felt the CDC members could not answer whether the results had been influenced by the elements' characteristics because the CDC were not shown the synopses nor the PAT worksheets. To make each member's response anonymous to the analyst, the members mailed their completed evaluation worksheets without signatures or return addresses to an administrative assistant in the Dean's office.

Nine evaluation worksheets were received (100% response). The evaluations clustered in high and moderate ratings groups. In the high ratings group, members said (a) the needs assessment was useful for learning about strengths and deficiencies in the existing curriculum (average rating of 4.9 of 5.0); (b) surveying graduates and employers was useful for determining the curriculum's efficacy (4.8); and (c) the needs assessment

was systematic, effective, and economical (4.7). Members rated as moderate (a) their involvement in the needs assessment process (4.1), (b) the usefulness of the findings in revising the curriculum (4.3), and (c) the extent the proposed curriculum reflected needs stated in the needs assessment report (3.8). None of the decision makers' ratings indicated disappointment with the needs assessment process or results. The members' responses are summarized in Table I.

In addition to the six rated items, the Curriculum Committee Evaluation Worksheet asked members to comment on the needs assessment. Concerning the usefulness of the needs assessment for determining the deficiencies of the DVM program, one member wrote, "Needs assessment is very useful for the clinical aspects of the veterinary curriculum." Another commented, "The needs assessment was a valuable tool The results are of value to me as an instructor looking at what practitioners perceived their knowledge to be in my discipline. I plan [to make] changes in my courses to enhance [students'] ability to learn pertinent information." And one member stated that the needs assessment "should be done again in 2001 for the 1999–2000 classes to see if things have improved, stayed the same, or deteriorated." Three members noted the inclusion of customers in the study. One member commented, "The needs assessment satisfied a political requirement that the practitioner stakeholder be included in the process of curriculum reform." Another noted, "It opens a door between the College and its alumni." However, one instructor warned, "Practitioners may not always be the best to judge how basic sciences fit into a complete veterinary curriculum." Concerning the usefulness of the findings for making changes in the veterinary curriculum, a member noted, "The results of the assessment were used in shaping the curriculum." The members' complete comments are contained in Appendix M, part 1.

In summary, the CDC ratings and written comments supported the analyst's conclusions to research questions 1 and 2 and subquestion 1a. In contrast to the analyst's observation, the CDC supported subquestion 1b by rating it moderately useful.

Table I

Appraisal of the Needs Assessment by the Curriculum Development Committee

Scale Evaluation criteria	Not useful 1	2	Neutral 3	4	Useful 5
1. Useful for determining deficiencies in the DVM curriculum (average = 4.9)	0	0	0	1 11%	8 89%
2. Useful for surveying graduates and their employers (average = 4.8)	0	0	0	2 22%	7 78%
3. Useful for making changes in the in the DVM curriculum (average = 4.3)	0	0	1 11%	4 44%	4 44%
4. Extent the new curriculum reflects findings of the needs assessment (average = 3.8)	0	0	2 22%	7 78%	0
5. Involvement of the CDC members in the needs assessment (average = 4.1)	0	0	1 11%	6 67%	2 22%
6. Need assessment is systematic, effective, and economical (average = 4.7)	0	0	0	3 33%	6 67%

Note. The three lines of each of the six criteria show the aggregate ratings, percent ratings, and average rating. N = 9 subject matter experts.

The CDC were not asked to address subquestion 2a.

In Event #17, the third stage of answering the research questions and subquestions, an independent reviewer examined the case study data. The independent reviewer, using a worksheet based on the research questions, evaluated the results of adapting the PAT model to an application in higher education. The reviewer had experience in teaching university-level curriculum design, had performed needs assessments in education, and was familiar with the College through independent and joint research he had performed there. Prior to implementing the needs assessment, the analyst had asked the independent reviewer to assess the outcomes of applying the PAT model to the College's curriculum revision. To complete this task, the analyst provided the independent reviewer with the data, synopses, needs assessment report, PAT worksheets, and an evaluation worksheet. The reviewer completed the Expert Appraisal Evaluation Worksheet (see example, Appendix G, part 2) and provided one page of comments. The evaluation worksheet included the case study research questions and subquestions. Each question was assessed using a five-level Likert-like scale.

The independent reviewer's ratings indicated (a) the needs assessment was useful for learning about strengths and deficiencies in the existing curriculum (a rating of 5.0 of 5.0); (b) including customers in the needs assessment was useful (5.0); (c) the results of the needs assessment was influenced by the characteristics of the model's four elements (5.0); (d) the PAT model involved the decision makers in the needs assessment (5.0); and (e) the PAT model compared 'favorably' (5.0) with other needs assessment models. The reviewer rated the usefulness of the findings for making changes in the curriculum as 4.0, or moderate.

The independent reviewer provided comments that were tied to the research questions and subquestions. He stated that the modified PAT model did "a good job eliciting the information needed to delineate the strengths and deficiencies of the curriculum." He agreed with the analyst that the design of the PAT model

acknowledged stakeholders' needs: "PAT seems to be an effective model as it elicits responses to problems that are germane. All of the stakeholders are involved It is a thorough process and should get at all of the needed information." He noted the importance of including the customer in the needs assessment: "The customer's perspective is very important Clearly, the addition of the customer has improved the model for this and other applications." He also recognized the model's recursive nature: "There are multiple ways in which data are solicited. The assessment is an iterative rather than a cross sectional process, and this is good." And he observed that "the decision makers were involved in many parts of the process."

However, the reviewer did not agree with the CDC that the results of the needs assessment were incorporated in the revised curriculum, nor with the analyst that the results might be used by the faculty to develop instruction to complete the curriculum revision. The reviewer was familiar with the culture of the College, and he expressed concern that the curriculum had not changed enough to fully address students' and practitioners' needs:

Reading the data, I am less sanguine than [the analyst]. I think that student and employer needs have not yet been fully addressed by the faculty on the CDC, and in five years there will still be the same kinds of problems. This may be my history with these learners, but the faculty do not seem to be too responsive to students, and they seem to disregard the things that they don't want to hear

Given the proposed changes, I would predict that the customers and the employers would not believe that the curriculum changes had not gone far enough, although the two groups might not mutually agree on what was needed.

In addition, the reviewer expressed some apprehension that the needs assessment ended with Phase One. He wanted to see the results of implementing Phases Two and Three of the PAT model in an organization that he also had studied. He stated:

My major concern relates to the point at which the process stopped. If the

second and third levels of the model could have been implemented, that is if we could have had an iteration of the data and seen some result, I would feel more comfortable. As it is, I worry that the problems discovered [by the needs assessment] will not be corrected because of the way in which the curriculum revision, as proposed, will be implemented.

The independent reviewer's ratings and comments supported the analyst's conclusions to research questions 1 and 2 and subquestions 1a and 2a. The reviewer was less supportive toward subquestion 1b, although he rated the outcome as moderately useful. The reviewer's full comments are contained in Appendix M, part 2.

Summary of the Data Analysis

Multiple sources were used in determining that the case study findings answered the research questions and subquestions: the analyst, the independent reviewer, and the Curriculum Development Committee. The three sources affirmed (a) the usefulness of the PAT model for determining deficiencies in a professional curriculum, (b) the usefulness of including customers in the needs assessment, and (c) the PAT model involved the decision makers in the needs assessment. The analyst and the independent reviewer agreed that the needs assessment results were influenced by the characteristics of the elements (not all sources were used to answer each question). The analyst and the independent reviewer agreed that the results were useful for making changes in the curriculum but did not think the results had been used in designing the new curriculum. A member of the CDC affirmed that the results had been used. Table II illustrates each research question and subquestion, the sources that addressed the questions, and their evaluation.

Summary of the Findings

Deductive analysis was used in this study as the means of achieving the research objective of applying the conceptual framework of the modified PAT model to an educational setting. Data gathering and interpretation were not discrete steps but were

Table II
Synthesis of the Three-Stage Review

Research Question	Source	Answer to the Question
1. How useful was the modified PAT model for determining deficiencies in a professional curriculum offered at one institution of higher learning?	Analyst CDC Reviewer	The modified PAT model was useful for determining deficiencies in the curriculum. "Needs assessment is very useful." "The model as modified seems to do a good job eliciting the information."
1a. How useful was the inclusion of customers in the curriculum needs assessment?	Analyst CDC Reviewer	Customers were useful to the needs assessment. "The needs assessment satisfied a political requirement that the practitioner be included in the process of curricular reform." "Customers are one of the most important stakeholders in the learning process."
1b. How useful were the needs assessment findings for making changes in the veterinary curriculum?	Analyst CDC Reviewer	The results were potentially useful for developing instruction, but contributed only slightly to the DVM curriculum. "The results of the assessment were used in shaping the curriculum." "Student and employer needs have not been fully addressed by the faculty on the CDC."

(table continues)

Research Question	Source	Answer to the Question
2. To what extent were the results of the needs assessment influenced by the characteristics of the model's four elements?	Analyst	The characteristics of the customers, decision makers, the analyst, and organization culture influenced the outcome.
	CDC	[not asked to answer the question]
	Reviewer	"All [outcomes] were influenced."
2a. To what extent did using the PAT model involve the institution's decision makers?	Analyst	The CDC were involved in the needs assessment from the start.
	CDC	"The needs assessment allowed the committee involved in curricular investigation to focus on relevant ideas."
	Reviewer	"The decision makers were involved in many parts of the process."

integrated, iterative parts of the process.

There were two levels of outcome in this study, the needs assessment findings and the results of the study to answer the research questions. The chief findings of the needs assessment were (a) curriculum-linked proficiencies that were rated by graduates as strengths or deficiencies in practice and (b) comments by graduates and employers about the DVM program including statements that the College's DVM curriculum did prepare graduates for entry-level practice. The skill deficiencies were generally like those of cohorts from other veterinary colleges who had been surveyed by other researchers. The proficiency information had never before been gathered within the College and was wanted by the CDC to document curriculum needs.

The case study results indicated that this application of the PAT model in one higher education setting generated information appropriate for answering the research questions. Subject matter experts supported the analyst's claim that the research questions and subquestions had been answered by the case study findings. Chapter V draws conclusions from the case study results and suggests topics for further research.

CHAPTER V

SUMMARY, SYNTHESIS, AND RECOMMENDATIONS

The purpose of this case study was to develop a deeper understanding of the PAT model by expanding it to include an additional element, the organization's customers; by applying it in a different organization setting, a college of veterinary medicine; and by involving a different analyst. The case study findings were used to answer the following questions: First, how useful was the modified PAT model for determining deficiencies in a professional curriculum offered at one institution of higher education. Second, how useful was the inclusion of customers in the needs assessment? Third, how useful were the needs assessment findings for making changes in the veterinary curriculum? Fourth, to what extent were the results of the needs assessment influenced by the characteristics of the model's four elements? Finally, to what extent did using the modified PAT model involve the institution's decisions makers in the needs assessment process? This chapter can be of interest to those outside the College because the case study findings provided insights into performing needs assessment in organizations and conducting research on the PAT model.

Summary of the Case Study

Chapter I pointed out that other veterinary schools had encountered a common problem: Veterinary curricula are apt to contain more information than can be taught by instructors or learned by students within a four-year curriculum. Ward and Bushby (1987) remarked that a knowledge explosion has crowded learning out of higher education. The AVMA accreditation group was aware of the problem, and had asked the College to reduce its curriculum hours for the first three program years. The Dean of the College had charged the CDC with the task of reducing the core course load. The

CDC proposed reviewing the program's strengths and deficiencies then designing a curriculum that would address the AVMA's concerns and correct the deficiencies. The CDC believed that a needs assessment conducted among a sample of recent practicing alumni would describe graduates' curriculum-related strengths and deficiencies.

In both education and business, instruction is often mistakenly prescribed as the solution to job performance deficits that arise from the organization's incomplete understanding of its mission and the stakeholders' needs. Needs assessment is an investigative tool for determining which deficits affect performance. Burton and Merrill (1977) defined needs assessment as a systematic process for determining goals, identifying discrepancies between goals and the status quo, and establishing priorities for action. There are many needs assessment methodologies. The analyst proposed to conduct a needs assessment using the PAT model, a human performance framework grounded in needs assessment theory, with the assistance of the CDC as subject matter experts. The needs assessment would investigate the quality of the College's DVM program from the perspective of graduates and employers.

The PAT model proposes that three elements' (the organization, the decision makers, and the analyst) characteristics affect the process and outcome(s) of each phase of the needs assessment. The model consists of three integrated components: (a) a conceptual framework composed of elements that influence decisions about needs; (b) a list of the phases and steps involved in determining training needs; and (c) a set of worksheets to guide the analysis (Sleezer, 1995). The author of the PAT model had field tested it in business and industry (Sleezer, 1990, 1995, 1996); however, this application of the model was the first study in a higher education setting. Further, the PAT model was modified for this study to include a fourth element, the customer. The customers were a sample of the College's graduates in private practice and the graduates' employers.

The needs assessment was designed to use survey and extant records as the means of investigation. A selection of 1991 through 1995 graduates were mailed a self-appraisal instrument linked to 47 proficiencies in the curriculum. Current and former employers of the graduates received a similar instrument. Ninety-seven graduates and 133 employers returned surveys (return rates of 66% and 64%, respectively). The data indicated that graduates were confident in their knowledge and skills, rating themselves as adequate or very good in 45 of the 47 proficiencies. Employers' ratings supported graduates' positive self-appraisals in 43 areas of proficiency. Employers' written comments stated that graduates were knowledgeable but lacked experience in the commercial practice of medicine and surgery. The data from the proficiency ratings and comments were displayed as Pareto distributions. The extant records—performance reports that students wrote during their externships—confirmed graduates' perceptions of proficiency in professional and work ethics, continuing education, and clinical examination.

The needs assessment determined that the College's graduates were capable of entering into practice. It also depicted the curriculum's strengths and deficiencies. The analyst shared the data and conclusions with the CDC and administrative faculty in a presentation and a written report.

Following the submission of the needs assessment report, the CDC began its review of the curriculum. The analyst was permitted to observe the sessions and record the decision makers' activities and his impressions. In addition, the analyst interviewed seven of the teaching faculty to gather information about the characteristics of organization members. Three additional faculty were interviewed to further understand the College's culture, rhetoric, politics, and instructional system. This information was necessary to address the actions included in the PAT worksheets.

The analyst affirmed the accuracy of the data through respondent validation. CDC members and interviewees were shown a synopsis of the respective observation,

faculty interview, or organization culture interview and asked to verify the accuracy of the analyst's findings. The data gathering and validation process was not linear but was recursive; the author often returned to his notes and the synopses to review the findings and recast his explanations following a newer understanding. The observation and interview information provided new insight into the organization's actions and caused the analyst to think about how the characteristics of the elements influenced the needs assessment events and outcome.

Analysis of the findings was accomplished in three stages. In the first stage, the analyst reviewed all the data. He used customer ratings; comments from the proficiency reviews; statements from the observation, interview, and culture synopses; extant data; and the needs assessment report to address the research questions and subquestions. The analyst determined from the data that (a) the modified PAT model was useful for uncovering deficiencies in one professional curriculum; (b) the inclusion of customers in the needs assessment was useful; (c) the needs assessment findings were potentially useful for making changes in the veterinary curriculum (although there was no observed evidence that the findings were the bases for the changes), (d) the needs assessment results were influenced by the characteristics of the modified PAT model's elements, and (e) employing the modified PAT model did involve the decision makers in the needs assessment process.

The second stage of analyzing the findings involved the nine faculty of the CDC. The CDC members were given Curriculum Committee Evaluation Worksheets and asked to rate the outcomes of the needs assessment. The worksheets included one research question and three subquestions (i.e., 1, 1a, 1b, and 2a—the committee was not asked to rate question 2, whether their characteristics influenced the need assessment findings). The members' ratings corresponded to the analysts' conclusions on those four research questions. One member's written comment indicated that the needs assessment findings were used to design the proposed curriculum.

In the third stage of analyzing the findings, an independent reviewer looked at all the data, the needs assessment report, and the case study synopses, then completed the Expert Appraisal Evaluation Worksheet. The reviewer was knowledgeable in the area of needs assessment, and he had performed curriculum studies with some faculty in the College. The worksheet included all the research questions and subquestions. The reviewer's ratings also were in agreement with those of the analyst: His ratings supported each of the five research questions and subquestions. However, his comments indicated doubts about whether the findings of the needs assessment were regarded carefully by the decision makers in designing the new curriculum.

The case study results indicated that this application of a modified PAT model in a higher education setting was successful in guiding a needs assessment for the College. Further, the study highlighted practical aspects of performing a needs assessment and applying the PAT model.

Aspects of the Needs Assessment

Reflection on the case study process and events gave the analyst insight about four aspects of conducting a needs assessment.

The action plan. An action plan should be a distinct outcome from a needs assessment if the decision makers decide to take action on the need or opportunity. Sleezer (1992) stated three potential outcomes from a needs assessment: documented information, management buy-in, and prioritized needs. Holton (1995) suggested intervention as a fourth outcome. In the case study, the CDC did not have authority to require department heads to begin designing new courses, so the curriculum revision lost momentum after approval. Zemke and Kramlinger (1982) pointed out similar situations, noting that a random implementation is better than a prioritized solution that is not acted upon. Thus, an action plan should specify who in the organization will be responsible for planning or overseeing the changes.

The negotiated solution. The needs assessment literature advises analysts to secure the backing of key decision makers before beginning (Dodge, 1987; Zemke and Kramlinger, 1982), but few researchers have written about the responsibility of decision makers when the needs assessment is concluded. In the case study, the Dean turned over the curriculum development tasks to department heads, saying he did not wish to influence faculty decisions. Seeing the Dean's reticence, the department heads made little effort to develop course content for the new curriculum. This event underscored the importance of senior members promoting the benefits of the negotiated solution and asking about the plan's progress at every opportunity.

Decision makers' involvement. Through the process of uncovering needs, people earn knowledge. In this study that ownership moved the decision makers to find solutions to curricular problems. Decision maker involvement is recognized in needs assessment literature (see Georgeson & Del Gaizo, 1984; Calabria, 1980) and is a feature of the PAT model (Sleezer, 1991). The analyst observed that the findings from the needs assessment were accepted in earnest, but he also observed conviction among CDC members as they discussed the findings of the student interviews which they had conducted. Arranging for the decision makers to join in gathering and analyzing data enhanced their commitment to a substantial and relevant change. Schein (1987) also concluded this point in his needs consulting model:

It is a key assumption ... that the client must learn to see the problem for himself, to share in the diagnosis, and to be actively involved in generating a remedy Expertise is less relevant than involving the client in diagnosis and helping him find a remedy which fits his situation. (p. 7)

Jargon. Nadler (1982) noted that "most work situations have their own language or jargon" (p.98). Needs that are expressed in the vernacular of the work environment must be clarified for the decision makers' understanding. In this case, the use of jargon seemed to influence the recognition of expressed needs. The independent reviewer felt

that a lack of recognition for practitioners' concerns affected the use of the needs assessment findings and impacted the proposed curriculum. When decision makers do not understand what is being expressed by customers or employees, one of Sleezer's (1993) intended outcomes for the PAT model— acknowledgment of needs through interaction of the elements—is diminished, and the other intended outcomes—negotiation and prioritization—are reduced.

Aspects of the PAT Model

The analyst also formed insights about the original and modified PAT models from the case study process and outcomes.

The customer. The addition of a fourth element, the customer, was congruent with the concept of the PAT model and crucial to the model's application in this situation. Not all cases will involve the needs of the customer element, as evidenced by Sleezer's (1990, 1995, 1996) first three applications. However, the customer should be recognized by analysts as being part of the PAT model. Sleezer (1993) touched upon this point saying, "Solutions should be based on a through understanding of the relationship between an organization's external environment and its internal systems" (p. 252). PAT's capacity to admit other parties whose needs affect the organization makes the model flexible both as a performance analysis tool and a research frame.

Utilizing the findings. If decision makers are likely to base their actions on politics or systemic procedures rather than facts, then the results of an integrated, comprehensive process like PAT may not be utilized fully. In the case study, the modified model successfully guided a needs assessment that provided information which the decision makers had requested. However, the CDC used few of the findings in revising the curriculum. The analyst attributed that action to (a) the short time period allotted the CDC for completion of the curriculum revision, (b) anticipated greater resistance from a few faculty toward curriculum revision that would encompass most of practitioners' expressed needs, and (c) differences in jargon and experience

between the customers and the decision makers. Thus, an analyst using the modified PAT model can discover the needs of customers and uncover the culture, rhetoric, and politics of the organization, but that information may not always move decision makers to act on needs. Recent thought on aspects of decision making—such as the loose coupling between project proposal and implementation (see March, 1994)—may provide insight into situations where the modified PAT model can be applied usefully.

Partial use of the model. The needs assessment in this case study was limited to Phase One, Organization Analysis, because information about the outcome of the curriculum was all the decision makers wanted. Although the PAT model is based on a tripartite plan for performance analysis, many applications will not require using all three phases (organization analysis, work behavior analysis, and individual capabilities analysis). Kaufman and English (in Holton, 1995) point out that not all assessments will proceed through three levels of analysis. Sleezer (1996) employed the PAT model in an organization analysis and a work behavior analysis of a manufacturing problem. Although Sleezer did not require users to begin with organization analysis, the analyst suggests that future users of the PAT model also begin with Phase One and proceed to Phases Two and Three to the extent the program warrants such investigation. Experts in needs assessment like Goldstein (1986); McGehee and Thayer (1961); Moore and Dutton (1978); Smith, Delahaye, and Gates (1986); and Zemke and Kramlinger (1982) also have suggested this approach.

A recursive approach to data gathering. The PAT model does not specify data gathering techniques, nor does varying the data gathering sequence preclude a result because the model does not seek a predetermined outcome. In this case, the data gathering procedure deviated from the order (Steps Three and Four) outlined in the PAT model. Varying the sequence of data gathering may or may not have influenced the outcomes of the needs assessment. The analyst also discovered that the process of completing the PAT worksheets required iterations in data gathering. Earlier worksheet

conclusions had to be updated and sometimes reformulated after new information was gathered. Creswell (1994) stated that concurrent data gathering, analysis, and interpretation are parts of qualitative research. Other needs assessment models suggest a linear approach where analysis is done after the data are collected. In this case, a linear approach could not have provided information for characterizing the elements or answering all the research questions.

Economy of use. PAT finds its best application in complex organizational problems. While the PAT model's structure allows it to be used with any size problem involving human capital, the type and amount of information asked in the worksheets can make PAT more costly to execute than deterministic needs assessment models. In the case study, implementing the PAT model balanced the value of assessing the curriculum against the loss of productivity associated with the time required of decision makers, organization members, and customers to provide and verify information for the analyst. Additionally, the PAT model probably is most economical when used with large scale organization changes (like reengineering or quality improvement) or with affective performance problems (like labor disputes). In such situations, awareness of diverse issues or feelings is critical to a constructive outcome, and the expense of investigation is small compared to the costs of poor performance, or the favored solution is costly and success cannot be predicted. Sleezer (1996) encountered the latter condition in assessing the need for training in a company that was planning to implement integrated manufacturing. The PAT findings in that case concluded that the company was not ready to switch to integrated manufacturing and that training managers in advance of the implementation would have been wasteful.

These insights into needs assessment and the PAT model may be helpful to other practitioners and researchers. The insights are not generalizations and should be tested in additional studies.

Recommendations for Practice and Research

Based on the findings of the case study, four recommendations are made for human resource practitioners who will use the PAT model in future applications.

The model's name. The model's name should be modified to reflect its broader application. The PAT model could evolve into the Performance Analysis Tool as Stanek (cited in Sleezer, 1990) suggested. This study demonstrated one application in which the PAT model was extended outside of business and used successfully to understand and resolve a performance need that did not call for industrial training. Additional theory building is needed to understand how an organization's culture and politics influence the PAT model's findings and their use by decision makers. Additionally, the model would benefit from further testing in other professional degree or certification programs.

The fourth element. An additional element should be added to the model. This case study illustrated that some organization-level performance problems involve people outside the organization. Thus, the model would be improved by the addition of a fourth element that is applicable to situations involving customers, vendors, government agencies, public interest groups, or academics. The fourth element should be labeled 'key population' as Kramlinger (cited in Sleezer, 1990) suggested. The additional element would require adding a worksheet to Phase One Step Two (B) similar to the Customer Worksheet used in this study (Appendix B, part 2). It should be designed to gather information about the needs, abilities, and characteristics of the key population.

Additions to the worksheets. Phase One of the PAT model should include two additions to the worksheets. The first change is to include a worksheet that will assist users in understanding the organization's system, culture, rhetoric, and politics. Because organizational behavior plays a key role in PAT's analysis of needs or opportunities, a structured guide to gathering the information used in Step Two (B) is useful. Essays and research from the HRD literature (e.g., Goldstein, 1986; Schein, 1985; Shapiro & Schall,

1990) are sources for the worksheet questions. The questions used in this study (see Appendix G) are an example of the questions the worksheet might ask.

The second change urges PAT users to involve decision makers in the data gathering and analysis process. Some of the actions in Phase One Step Three (see Appendix A, part 2) could be restated to emphasize decision maker participation. For example, the action "Experience current performance," could be written "Check and answer: Decision makers ☐ and/or analyst ☐ examined current performance."

Reporting the results. Feedback should be given to those who expressed needs. In his review of the needs assessment literature, the analyst encountered but one publication that specifically recommended getting confirmation of stakeholders' needs and word of the proposed solution to those stakeholders (see Wyman & Hudson, 1984). Typically, the analyst reports his or her findings to senior managers who are presumed to inform subordinates of the disposition (Witkin, 1984). Bowman (1987) stated that everyone participating in a needs assessment is entitled to feedback. Therefore, the final step in each of the three Phases of PAT should include a response item for learning what actions decision makers have planned for making the need intervention(s) known to the stakeholders. This recommendation also applies to performance analysis models other than PAT.

Worksheets and the model. Although PAT has been validated by subject matter experts and tested in the field, the model would be more robust if the conceptual framework was not harnessed to specific worksheets. In place of specific worksheets, the third part of the model should specify the types of information needed to address the three phases and the parameters for generating questions that will produce the information needed to complete each phase. This approach would make the model's frame entirely theoretical. It also would allow experienced analysts to construct customized worksheets that address unique performance analysis situations. The existing worksheets should be retained as examples or for use by novices. Customized

worksheets would have no content validity without repeating Sleezer's (1990) subject matter validation process.

Implications for future research. The recommendations cited above suggest additional research needs to be undertaken in at least three areas. First, the study should be repeated by other researchers and in different settings. Different analysts will bring different mixtures of education, work experience, and human resources philosophy to their undertaking of the PAT process. Since PAT is an interactive process, different analyst characteristics may produce new observations about the model and additional recommendations. Different analysts may apply the PAT model in additional settings outside business and industry. Government agencies, not-for-profit organizations, and other educational institutions can use the model to investigate their distinct performance problems. Some of these applications also may involve key populations like customers.

Second, there is the need to perform post-hoc research upon case studies using PAT. Witkin (1984) stated that few studies have identified the utilization of needs assessment findings and recommendations. It would be useful to know (a) whether utilization of PAT's findings by decision makers is greater than for other needs determination methods, and (b) whether interventions generated by the PAT model are more systematic, effective, and economical (see Swanson and Gradous, 1980) than solutions from other needs determination methods.

Third, there is a need to know what criteria to use in selecting a needs assessment model. In particular, what factors determine when it is feasible to use the PAT model? Because the PAT model requires extensive investigation, an analyst should ask, when does an organization benefit by investing the time of performers, decision makers, analysts, and key populations in conducting PAT instead of conducting a simpler model of need assessment (e.g., a deterministic model) or taking no action at all? A worksheet similar to one used by Swanson and Gradous (1990) to calculate the cost effectiveness of job training could define the benefit criteria and arrive at a figure to report to the

organization's decision makers.

Summary of the Research

A statement from the novel Jurassic Park (Crichton, 1993) characterized the views of some faculty about the College's previous curriculum: "You get the engineering correct and the animals will fall into place. After all, they're trainable" (p. 141). The DVM curriculum had expanded through a ten-year period to include old and new information, and students were expected (but unable) to learn it all. Brethower (1993) sheds some light upon the situation by stating that "universities are hampered by an organization structure that is designed to focus upon academic disciplines rather than real-world problems" (p. 88). In both education and business, increased training is often mistakenly prescribed as the solution to job performance deficits that may arise from incomplete understanding of the organization's mission or stakeholders' needs.

Needs assessment is a procedure for discriminating between training or education and other job-related interventions. This study used the PAT model to assess the needs of one veterinary medical curriculum. PAT is a human performance framework grounded in needs assessment theory and tested in business and industry. The findings from implementing the PAT model in a higher education setting helped the organization's decision makers to acknowledge stakeholders in curriculum planning, document the quality of an existing degree program, and allowed them to base curriculum change on practitioners' needs. In addition, implementing the PAT model involved the CDC members in gathering information to document curriculum strengths and deficiencies. It also showed how the characteristics of the model's elements influenced perceptions of the problem (what to teach and what to forego) and the outcome (what strategy to select).

The results of this case study have extended the body of knowledge about one method of need assessment, the PAT model, into a new domain and expanded it to recognize the needs of stakeholders outside the host organization. Additional study by

other researchers can further expand the PAT model's applications, provide insight into the process, and help analysts be successful in practice. The importance of needs determination to today's competitive organizations, including education institutions, makes this research crucial.

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APPENDICES

APPENDIX A

THE PERFORMANCE ANALYSIS FOR TRAINING MODEL

Part 1—The Performance Analysis for Training Model

Part 2—Phase One Worksheets

The Performance for Training Model

The focus of the Performance Analysis for Training (PAT) model is on identifying the organization's performance needs that should be addressed with training. The model includes a graphic of the three elements that affect decisions about training needs, a list of the phases and steps involved in the process of determining training needs, and a set of worksheets that detail the phases, steps, and activities involved in determining training needs in an organization.

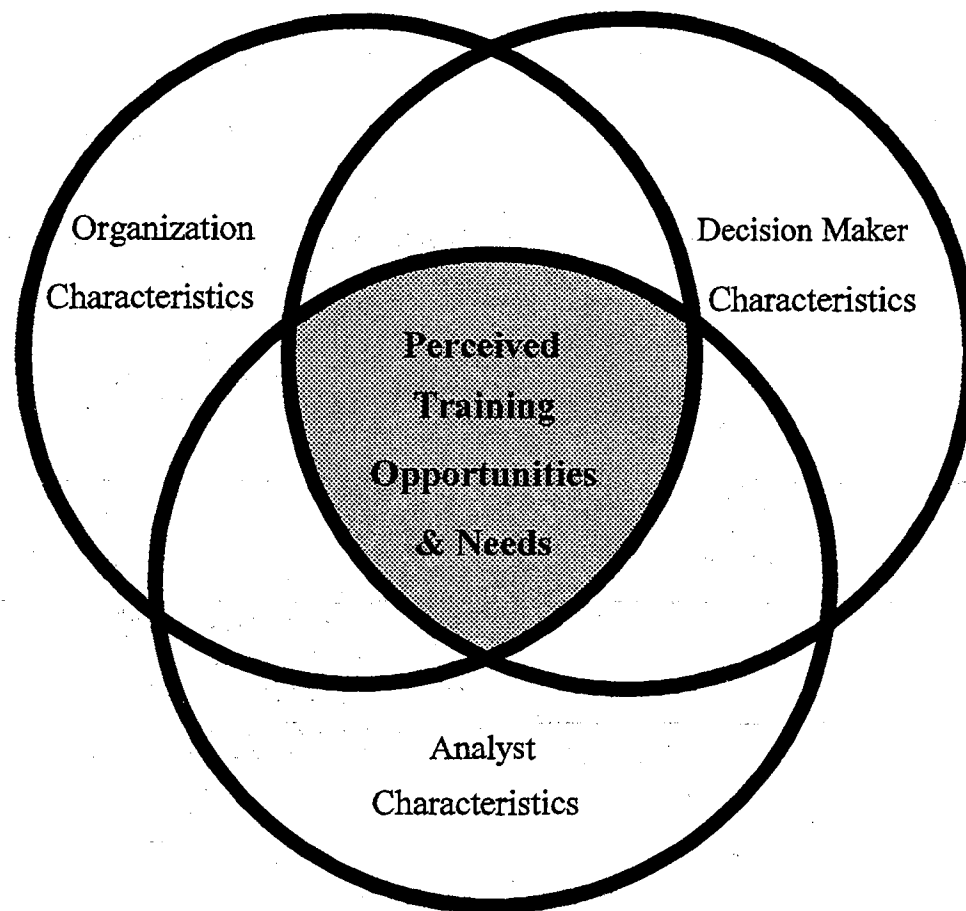
Based on information gained from interviewing experts in organization behavior and training needs assessment; reviewing the training needs assessment literature; and reviewing the literature on organizations as political, systematic, cultural, and rhetorical entities, three elements were identified that affect training needs. These elements are organization characteristics, decision maker(s) characteristics, and analyst(s) characteristics. The graphic that depicts the elements is shown on the following page.

Organization characteristics are the distinguishing traits, features, and qualities of an organization that affect the definition and determination of training opportunities or needs. The literature characterizes organizations as being systematic, cultural, political, and rhetorical entities. The specific traits, features, and qualities evident in the characterization of organizations include the internal and external environment (Watson, 1979) and other system-wide components of an organization that may affect the training program (Goldstein, 1986); the organization's climate or culture (Goldstein, 1986; Hansen, 1989), the politics surrounding the situation, and the language used in the organization to influence behavior (Schall & Shapiro, 1989).

Decision maker(s) characteristics include the distinguishing traits, features, and qualities of those who make determinations or judgements about training programs. Some of the characteristics identified in the literature include the expectations that decision makers have about training programs (Goldstein, 1986; Kaufman & Stone, 1983), the amount of consensus among decision makers (Goldstein, 1986), and the amount of support that the decision makers have for training.

Analyst characteristics are the distinguishing traits, features, and qualities of the individual who manages the needs assessment process and project. Some characteristics identified in the literature include ability of the analyst and his or her biases toward behavior or cognitive models (Goldstein, 1986; Zemke, 1982).

Note. The PAT worksheets in this appendix are reproduced from Catherine M. Sleezer, (1990). The Development and Validation of a Performance Analysis for Training Model, Report #39, Training and Development Research Center, University of Minnesota with permission of the author.



Elements that Affect Decisions about Training Needs

The shaded area where the circles overlap is the area of commonality among the decision maker(s), the analyst, and the organization. The extent that the circles overlap can vary from situation to situation. It is through the interaction of the three elements in this shaded area that training opportunities or needs are perceived, negotiated, and prioritized.

The PAT model consists of three phases. The first phase focuses on analysis of organizational opportunities or needs for training, the second phase focuses on work behavior analysis to identify the specific behaviors needed to accomplish the work, and the third phase focuses on analysis of individual capabilities to determine which employees need training and the kind of training they need.

Phases and Steps of the Performance Analysis for Training (PAT) Model

Phase One—Organization Analysis

Determine where in the organization or work group the training emphasis should be placed.

The steps in this phase are as follows:

1. Identify "perceived opportunities or needs"
2. Determine the purpose and parameters of the analysis.
3. Gather information about potential training opportunities/needs.
4. Gather anecdotal information.
5. Analyze the information.
6. Report the findings to decision maker(s).
7. Decision maker(s) acknowledge, prioritize, and determine the training opportunities/needs.

Phase Two—Work Behavior Analysis

Identify and document the specific behaviors needed to accomplish the work.

The steps in this phase are as follows:

1. Identify the work to be analyzed.
2. Construct a Work Behavior Analysis Plan.
3. Conduct the work behavior analysis.
4. Gather anecdotal information.

Phase Three—Analysis of Individual Capabilities

Determine which employees need training and the kind of training they need.

The steps in this phase are as follows:

1. Identify characteristics and capabilities of the group of trainees.
2. Gather anecdotal information.
3. Gather information about nontraining causes of performance.
4. Synthesize and analyze the information.
5. Report findings to the decision maker(s).
6. Communicate findings and anecdotes to those who will design the training.

Phase One: Organization Analysis

Determine where in the organization or work group the training emphasis should be placed.

Step One: Identify perceived opportunities

This step occurs during the initial interviews between the analyst and the client. It is part of the discovery or sales process. Note that the information gathered in this step can be misleading because people at different places in the organization can have different perceptions of the opportunities or needs.

Identify the perceived opportunities and the individuals who view them as important.

Perceived opportunities:

Perceived by:

What is the product of the organization or work group?

Who is the client?

Analyze the information that has been gathered up to this point.

Which of the perceived opportunities are related to the organization's bottom line?

Analyze the information that has been gathered up to this point.

How are the perceived opportunities related to the bottom line?

Do the perceived opportunities seem to have a knowledge, skill, or attitude component that can be addressed with training? (yes/no)

Phase One Step Two: Determine the Purpose and Parameters of the Analysis		
Step Two (A) Use the following items to identify the salient characteristics of the organization, decision makers, analyst, and customer elements and to record summary notes.		
Characteristics	The Organization	Summary
Organization culture: climate for curriculum change; support for the training function; history of training in the organization; location of the training function; organization goals, philosophy, emphasis and objectives; values promoted by the organization; amount of consensus or conflict within the organization; legal, social, economic, and political factors inside and outside the organization.		
The reward structure		
Political factors surrounding the situation		
The organization's internal and external environment		
The broader program of which training is an element		
Supporting systems such as the selection, human factors, engineering, and work procedures		
Terminology and language used in the organization		
Other factors		
Analyze the information that has been gathered up to this point.		

Phase One Step Two: Determine the Purpose and Parameters of the Analysis

Step Two (A) Use the following items to identify the salient characteristics of the organization, decision makers, analyst, and customer elements and to record summary notes.

Characteristics	The Decision Makers	Summary
Expectations of the decision makers		
Amount of support for training		
Amount of consensus among the decision makers		
Style and experience of the decision makers		
Skill level of the decision makers		
The level of the decision makers' position in the organization		
Other factors		
Analyze the information that has been gathered up to this point.		

Phase One Step Two: Determine the Purpose and Parameters of the Analysis		
Step Two (A) Use the following items to identify the salient characteristics of the organization, decision makers, analyst, and customer elements and to record summary notes.		
Characteristics	The Analyst	Summary
Acting as an internal or external consultant?		
Biases, attitudes, beliefs, and values		
Skill level		
Type of power		
Style and experience		
Other factors		
Analyze the information that has been gathered up to this point.		

<p align="center">Phase One Step Two: Determine the Purpose and Parameters of the Analysis</p> <p>Step Two (B) Using the information from Step One and Step Two (A), determine the purpose and parameters of the performance analysis for training.</p>	
Action	Notes
<p>Specify the purpose of assessment, the kinds of information to be gathered, the resources available to conduct the analysis, the boundaries of the needs assessment, the type of needs assessment, the format of the report, the recipients of the report, and the criteria that will be used to evaluate the analysis process, the proposed solutions, and the product.</p>	
<p>Do the decision makers and the analyst agree about the purpose and parameters of the performance analysis? (A number of strategies can be used to negotiate this agreement, but do not proceed with the needs assessment until there is agreement.)</p>	
<p>Is the agreement appropriate based on the organization's salient characteristics, yes or no?</p>	

<p align="center">Phase One Step Three: Gather Information Potential Training Opportunities</p> <p>On the worksheet below indicate the actions taken and record summary notes about the results.</p>	
Action	Notes
Begin the process at the most general level and proceed to the most specific.	
Use multiple sources and information gathering methods.	
Gather both quantitative and qualitative information	
Examine current and future performance expectations	
Examine current performance	
Identify measures of the performance	
Gather information about possible causes and potential solutions	
Gather information about potential trainees	
Identify those who support and those who do not support the training needs	
Identify the subject matter experts	
Use the "Solution Finder" (Swanson & Sisson, 1985) to identify potential training and management solutions.	
Renegotiate the purpose and parameters of the analysis if necessary.	

Phase One Step Four: Gather Anecdotal Information

Gather and record examples of anecdotes, stories, vocabulary, and examples of positive or negative experiences that can be used for instruction or that can be used to describe the training need. Record the sources and the context.

Analyze the information which has been gathered to this point

Phase One Step Five: Analyze Information On the worksheet below indicate the actions taken and record summary notes about the results.	
Actions	Notes
Verify data analysis with those who provided the data input, if possible	
Determine the causes of performance issues	
Identify training and nontraining issues	
Determine solution alternatives	
Determine the criteria for selecting solutions	
Prioritize potential opportunities	
Forecast the financial benefits of selected options relative to the organization's bottom line	
Renegotiate the purpose and parameters of the analysis if necessary	

<p align="center">Phase One Step Six: Report the Findings to the Decision Makers</p> <p>On the worksheet below indicate the actions taken and record summary notes about the results.</p>	
Actions	Notes
Explain why the Performance Analysis for Training was undertaken	
Describe how the information was gathered	
Identify the stated need(s)	
Include the findings of the performance analysis for training	
Identify the training and nontraining solutions	
Identify the most appropriate training solutions	
Specify the forecast costs and benefits of the solutions	
Specify the significance of the findings so the client's question of 'so what' is answered	
Do action planning with the client	
Other findings	

Phase One Step Seven: Decision Makers Acknowledge, Prioritize, and Determine the Training Opportunities or Needs

The decision maker(s) identify the specific performance needs / opportunities for which training resources should be allocated.

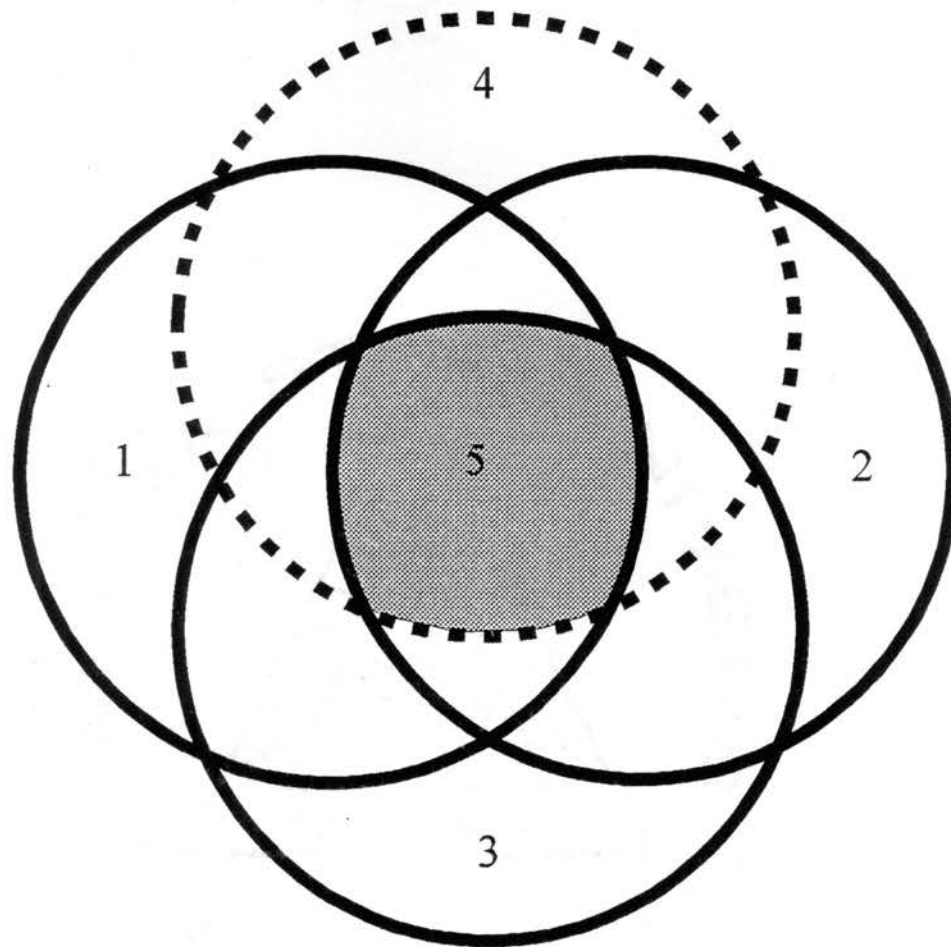
APPENDIX B

THE MODIFIED PAT MODEL

Part 1—Elements that Effect Decisions About Training

Needs: The Modified PAT Model

Part 2—Step Two (A) Customer Worksheet



Note. Elements of the model: 1 = organization characteristics; 2 = decision maker(s) characteristics; 3 = analyst characteristics; 4 = customer characteristics; 5 = perceived training opportunities or needs.

Elements that Affect Decisions about Training Needs: The Modified PAT Model

<p align="center">Phase One Step Two: Determine the purpose and parameters of the analysis</p> <p>Step Two (A) Customer Worksheet. Use the following chart to record the salient characteristics of the customer and summary notes.</p>		
Characteristics	The Customer	Summary
<p>Who is the client and what is the goal? What is the nature and degree of agreement or dissent among customer groups? (Goldstein, 1986).</p>		
<p>What do customers see as the valued outcome or benefit, and how do they define quality? (Geber, 1990) What measures will they use to determine if the benefit is met? (Robinson & Robinson, 1995)</p>		
<p>What are the professed and actual needs of the customer? (Zemke & Kramlinger, 1982) How are the needs linked to performance or accountability? (Gilbert, 1978)</p>		
<p>Who are the performers, and do they have the skills, knowledge, or motivation to do what is needed to achieve the goal? (Rossett, 1988) What do customers expect the performer to do differently? (Robinson & Robinson, 1995)</p>		
<p>Is there alignment between the customer's goals and the organization's goals? (Tosti & Jackson, 1994) What inside or outside forces threaten collaboration? (Robinson & Robinson, 1995)</p>		
<p>Other factors</p>		
<p>Analyze the information</p>		

Note. Author citations refer to sources that suggested the kernel ideas that underlie the respective question. The analyst developed the interview questions. Sources are included in the References section of the study.

APPENDIX C

PROFICIENCY INSTRUMENTS

Part 1—Letter from the Dean

Part 2—Instructions and Graduate
Proficiency Instrument

Part 3—Instructions and Employer
Proficiency Instrument

[the College's letterhead]

March 11, 1996

Dear Doctor [name]:

I am writing you to introduce a research project that the College of Veterinary Medicine at [University] supports fully, and I want to encourage your participation. This study, a needs assessment, is timely for us. We are in the process of reviewing the Doctor of Veterinary Medicine curriculum to make it more applicable both to today's practice and that in the future.

The field research for this project is being done by Kenneth Knorr, a graduate student from Oklahoma State University. Kenneth's expertise is in Human Resources Development, and he is working with us to perform this need assessment in conjunction with our curriculum review. The [University] College of Veterinary Medicine needs to know whether our veterinary graduates are prepared to enter into practice. If they have been less than fully capable we want to adjust the curriculum for the sake of future graduates. And we want to offer appropriate continuing education to improve the skills of our alumni.

I encourage you to take time to complete the research materials that are enclosed with this letter. This research effort provides you with an opportunity to share your observations with us in a way that will shape the educations of tomorrow's veterinarians. Please take advantage of this opportunity.

Thank you for giving this matter your serious consideration. If you have questions about the role of the College of Veterinary Medicine in this project, please call me at [telephone] or e-mail [network address]. If you would like to know the outcomes of this research, please write to the address above for a summary report.

Sincerely,

[signature and name], DVM
Dean

March 11, 1996

Dear Doctor:

We are asking you to help us assess how well the [University] DVM program prepared you to enter into professional practice. The research instrument in this packet contains questions pertaining to important skills, knowledge, and values which you apply in your work and which are emphasized in the current curriculum of the College of Veterinary Medicine.

The intent of our research is to use feedback from veterinarians in the field for guiding us toward making changes in the DVM degree program.

Your name was selected from CVM graduates 1991 through 1995. Some veterinary employers will receive similar materials, but there is **no** intent to link responses between practitioners and employers.

We know there are many demands upon your time, so we have tried to make the research instrument easy to complete. If you believe that veterinary education periodically must change to reflect growth in the profession, please take 15 minutes to read and fill out the instrument. A business reply envelope is included for your convenience and anonymity. We believe that your time will be invested well, and your feedback will benefit the profession by producing highly qualified future graduates.

Your response will be treated as anonymous. We cannot connect your response to an employer's response (he or she may not receive a research packet). The number on the return envelope is **only** for remailing (a staff assistant will be contacting you in two weeks if she has not received your reply). The staff assistant will note that you have responded, and she will remove your name from her remailing list. She will destroy the opened envelope before passing on the contents to me. Your completed instrument will not be seen by anyone but me, and I will keep all responses under lock. The staff assistant will keep the remailing list locked and in her confidence. Your participation is voluntary, and there is no penalty for not participating. The findings of this project will be reported as group data to CVM and in my dissertation.

We earnestly seek your assistance in this study. Please complete and return the research instrument by **March 27, 1996**. If you have questions about this project you may contact the Dean of CVM [name and telephone], me [telephone], or the [University] Institutional Review Board [contact name, telephone, and address].

Thank you, Doctor, for your time and your support in this research.

Sincerely,

Kenneth Knorr
Project Researcher

Proficiency Review by Recent DVM Graduates

We would like an appraisal of your veterinary education at [University] College of Veterinary Medicine. In particular, how would you rate your current performance based on the education you received? For each of the evaluation questions below check one rating (very good, adequate, weak) that best summarizes your proficiency. Feel free to comment in the space below the statements. Your responses will be anonymous.

Part 1: Foundation Knowledge

How effective are you in using your core knowledge to solve a wide variety of animal health problems?

1. very good ☐ adequate ☐ weak ☐

How proficient are you in your clinical reasoning?

2. very good ☐ adequate ☐ weak ☐

How effective are you at applying pathogeneses of diseases to 'patient management'?

3. very good ☐ adequate ☐ weak ☐

Part 2: Clinical Practices

How proficient are you at informing clients? For example,

- | | | | | |
|------------------------------|------------------------------------|-----------------------------------|-------------------------------|---|
| 4. condition or outcome | very good <input type="checkbox"/> | adequate <input type="checkbox"/> | weak <input type="checkbox"/> | not practiced <input type="checkbox"/> |
| 5. treatment options | very good <input type="checkbox"/> | adequate <input type="checkbox"/> | weak <input type="checkbox"/> | not practiced <input type="checkbox"/> |
| 6. cost estimates | very good <input type="checkbox"/> | adequate <input type="checkbox"/> | weak <input type="checkbox"/> | not practiced <input type="checkbox"/> |
| 7. fellowship or consolation | very good <input type="checkbox"/> | adequate <input type="checkbox"/> | weak <input type="checkbox"/> | not applicable <input type="checkbox"/> |

How do you assess your performance during clinical emergencies?

8. very good ☐ adequate ☐ weak ☐ not applicable ☐

1: Please continue to the next page.

What is your ability to communicate information and intent to coworkers or other professionals?

9. in speech very good ☐ adequate ☐ weak ☐
10. in writing very good ☐ adequate ☐ weak ☐ not observed ☐

Part 3: Preventive Practices

How do you rate your ability to develop the following disease prevention protocols?

11. selecting vaccines very good ☐ adequate ☐ weak ☐ not practiced ☐
12. controlling parasites very good ☐ adequate ☐ weak ☐ not practiced ☐
13. managing a disease very good ☐ adequate ☐ weak ☐ not practiced ☐
prevention program

What is your evaluation of your epidemiological knowledge (preventing the spread of diseases)?

14. very good ☐ adequate ☐ weak ☐ not practiced ☐

How effective are you in protecting public health? Typically,

15. minimizing the transmission of zoonotic diseases.

very good ☐ adequate ☐ weak ☐ not applicable ☐

16. Maintaining food animals free of contamination from drug products.

very good ☐ adequate ☐ weak ☐ not applicable ☐

Part 4: Diagnostic Practices

How proficient are you in these areas of clinical examination?

17. patients' histories very good ☐ adequate ☐ weak ☐
18. signalment very good ☐ adequate ☐ weak ☐
19. physical examinations very good ☐ adequate ☐ weak ☐

2: Please continue to the next page.

How judicious are you in making (or ordering) diagnostic tests?

20. very good ☐ adequate ☐ weak ☐ not practiced ☐

How skillful are you in performing and/or interpreting laboratory tests (either in-house or commercial)? Specifically,

21. **enzymology** very good ☐ adequate ☐ weak ☐ not practiced ☐

22. **hematology** very good ☐ adequate ☐ weak ☐ not practiced ☐

23. **toxicology** very good ☐ adequate ☐ weak ☐ not practiced ☐

24. **parasitology** very good ☐ adequate ☐ weak ☐ not practiced ☐

25. **microbiology** very good ☐ adequate ☐ weak ☐ not practiced ☐

26. **necropsy** very good ☐ adequate ☐ weak ☐ not practiced ☐

27. **radiography / ultrasound** very good ☐ adequate ☐ weak ☐ not practiced ☐

*Part 5: Therapeutics Practices***How proficient are you in common surgical procedures?**

28. very good ☐ adequate ☐ weak ☐ not practiced ☐

How competent are you in these areas of 'patient management?'

29. **evaluating the response** very good ☐ adequate ☐ weak ☐ not practiced ☐

30. **selecting alternate therapy** very good ☐ adequate ☐ weak ☐ not practiced ☐

31. **establishing a prognosis** very good ☐ adequate ☐ weak ☐ not practiced ☐

How knowledgeable are you about pharmacological agents? For example,

32. **in selection** very good ☐ adequate ☐ weak ☐ not practiced ☐

33. **in legal use** very good ☐ adequate ☐ weak ☐ not practiced ☐

34. **in safe dosage** very good ☐ adequate ☐ weak ☐ not practiced ☐

3: Please continue to the next page.

How competent are you in 'pain management' and the use of anesthetics?

35. very good ☐ adequate ☐ weak ☐ not practiced ☐

*Part 6: Practice Management***How do you describe the 'fit' between your animal specialization at CVM and the practice's specialty?**

36. very good ☐ adequate ☐ weak ☐

How effective are you in establishing supportive relationships with coworkers and other practitioners ?

37. very good ☐ adequate ☐ weak ☐

How do you rate your understanding of (or compliance with)...

38. professional ethics? very good ☐ adequate ☐ weak ☐

39. a work ethic? very good ☐ adequate ☐ weak ☐

How effective are you at locating, appraising, and applying medical information sources? For example...

40. books and journals very good ☐ adequate ☐ weak ☐ not available ☐

41. electronic databases very good ☐ adequate ☐ weak ☐ not available ☐

42. medical software very good ☐ adequate ☐ weak ☐ not available ☐

How proficient are you at demonstrating these business and management principles?

43. cost awareness very good ☐ adequate ☐ weak ☐

44. service quality very good ☐ adequate ☐ weak ☐

45. billing for materials used very good ☐ adequate ☐ weak ☐ not practiced ☐

46. profitability very good ☐ adequate ☐ weak ☐ not practiced ☐

4: Please continue to the final page.

How do you feel about continuing your professional education?

47. very good ☐ adequate ☐ weak ☐

48. Check 3 of the following characteristics which you believe to be most important in new veterinary graduates:

inquiry ☐ consistency ☐ organization ☐ conscientiousness ☐ fairness ☐

self-discipline ☐ team worker ☐ compassion ☐ practicality ☐ enthusiasm ☐

Part 7: Respondent Information

49. **Your practice** equine ☐ food/large ☐ small animal ☐ mixed ☐ other ☐

50. **Your gender** female ☐ male ☐

51. **Years in practice since licensure** 1 ☐ 2 ☐ 3 ☐ 4 ☐ more ☐

52. **Your track at CVM** equine ☐ food/large ☐ small animal ☐ mixed ☐

53. **Please use this space to tell us how we are doing. For example, what valuable capabilities did you acquire? What skills do you believe you lack? What topics do you think we should teach differently? What would you like to change?**

Thank you, Doctor. We do appreciate your time, and your answers will be useful to us.

March 11, 1996

Dear Doctor:

We are asking you to help us assess how well the [University] College of Veterinary Medicine DVM program prepared recent graduates (1 to 5 years working experience) for professional practice. The research instrument in this packet contains questions about skills, knowledge, and values which are important in your practice and which are emphasized in the current curriculum.

The intent of our research is to use feedback from veterinarians in the field for guiding us toward making changes in the DVM degree program.

Your name was selected from a group of employers who have hired or supervised [University] CVM graduates from 1991 through 1995. Some CVM graduates will receive similar materials, but there is **no** intent to link responses between employers and employed graduates.

We know there are many demands upon your time, so we have tried to make the research instrument easy to complete. If you believe that veterinary education periodically must change to reflect growth in the profession then take 15 minutes to read and fill out the instrument. A business reply envelope is included for your convenience and anonymity. We believe that your time will be invested well, and your feedback will benefit the profession by producing highly qualified future graduates.

Your response will be treated as anonymous. We cannot connect your response to an employee's response (he or she may not receive a research packet). The number on the return envelope is **only** for remailing (a staff assistant will be contacting you in two weeks if she has not received your reply). The staff assistant will note that you have responded, and she will remove your name from her remailing list. She will destroy the opened envelope before passing the contents to me. Your completed form will not be seen by anyone but me, and I will keep all responses under lock. The staff assistant will keep the remailing list locked and in her confidence. Your participation is voluntary, and there is no penalty for not participating. The findings of this project will be reported as group data to the CVM and in my dissertation.

We earnestly seek your assistance in this study. Please complete and return the research instrument by **March 27, 1996**. If you have questions about this project you may the Dean of the College of Veterinary Medicine [name and telephone], contact me [telephone], or the [University] Institutional Review Board [contact name, telephone, and address].

Thank you, Doctor, for your time and support in this research.

Sincerely,

Kenneth Knorr
Project Researcher

Proficiency Review of Recent DVMs by the Veterinary Employer

Please tell us about the performance of the most recent [University] graduate veterinarian(s) whom you have supervised or employed within the last 5 years. The evaluation criteria are stated below. For each criterium check one rating (very good, adequate, weak) that summarizes the proficiency of your most recent [University] graduate(s). Feel free to comment in the space below a statement. Your responses will be anonymous.

Part 1: Foundation Knowledge

How effective are our graduates in using their core knowledge to solve a wide variety of animal health problems?

1. very good ☐ adequate ☐ weak ☐

How proficient are our graduates in their clinical reasoning?

2. very good ☐ adequate ☐ weak ☐

How effective are our graduates at applying pathogeneses of diseases to 'patient management'?

3. very good ☐ adequate ☐ weak ☐

Part 2: Clinical Practices

How thorough are our graduates at informing clients? For example,

4. **condition or outcome** very good ☐ adequate ☐ weak ☐ not practiced ☐

5. **treatment options** very good ☐ adequate ☐ weak ☐ not practiced ☐

6. **cost estimates** very good ☐ adequate ☐ weak ☐ not practiced ☐

7. **fellowship or consolation** very good ☐ adequate ☐ weak ☐ not applicable ☐

What is the performance of our graduates in clinical emergencies?

8. very good ☐ adequate ☐ weak ☐ not observed ☐

1: Please continue to the next page.

How do you rate our graduates at communicating information and intent to coworkers, or other professionals?

9. **in speech** very good ☐ adequate ☐ weak ☐
10. **in writing** very good ☐ adequate ☐ weak ☐ not observed ☐

Part 3: Preventive Practices

How effective are our graduates in developing the following disease prevention protocols?

11. **selecting vaccines** very good ☐ adequate ☐ weak ☐ not practiced ☐
12. **controlling parasites** very good ☐ adequate ☐ weak ☐ not practiced ☐
13. **managing a disease prevention program** very good ☐ adequate ☐ weak ☐ not practiced ☐

How do you rate our graduates' epidemiological knowledge (preventing the spread of diseases)?

14. very good ☐ adequate ☐ weak ☐ not practiced ☐

How effective are our graduates at protecting public health? Typically,

15. **minimizing the transmission of zoonotic diseases.**

very good ☐ adequate ☐ weak ☐ not applicable ☐

16. **maintaining food animals free of contamination from drug products.**

very good ☐ adequate ☐ weak ☐ not applicable ☐

Part 4: Diagnostic Practices

How proficient are our graduates in these areas of clinical examination?

17. **patients' histories** very good ☐ adequate ☐ weak ☐
18. **signalment** very good ☐ adequate ☐ weak ☐
19. **physical examinations** very good ☐ adequate ☐ weak ☐

2: Please continue to the next page.

How judicious are our graduates in making (or ordering) diagnostic tests?

20. very good ☐ adequate ☐ weak ☐ not practiced ☐

How skillful are our graduates in performing and/or interpreting laboratory tests (either in-house or commercial)? Specifically,

21. **enzymology** very good ☐ adequate ☐ weak ☐ not practiced ☐

22. **hematology** very good ☐ adequate ☐ weak ☐ not practiced ☐

23. **toxicology** very good ☐ adequate ☐ weak ☐ not practiced ☐

24. **parasitology** very good ☐ adequate ☐ weak ☐ not practiced ☐

25. **microbiology** very good ☐ adequate ☐ weak ☐ not practiced ☐

26. **necropsy** very good ☐ adequate ☐ weak ☐ not practiced ☐

27. **radiography / ultrasound** very good ☐ adequate ☐ weak ☐ not practiced ☐

*Part 5: Therapeutic Practices***How proficient are our graduates in common surgical procedures?**

28. very good ☐ adequate ☐ weak ☐ not practiced ☐

How competent are our graduates in these areas of 'patient management'?

29. **evaluating the response** very good ☐ adequate ☐ weak ☐ not practiced ☐

30. **selecting alternate therapy** very good ☐ adequate ☐ weak ☐ not practiced ☐

31. **establishing a prognosis** very good ☐ adequate ☐ weak ☐ not practiced ☐

How knowledgeable are our graduates about pharmacological agents? For example,

32. **in selection** very good ☐ adequate ☐ weak ☐ not practiced ☐

33. **in legal use** very good ☐ adequate ☐ weak ☐ not practiced ☐

34. **in safe dosage** very good ☐ adequate ☐ weak ☐ not practiced ☐

3: Please continue to the next page.

How competent are our graduates in 'pain management' and the use of anesthetics?

35. very good ☐ adequate ☐ weak ☐ not practiced ☐

Part 6: Practice Management

What is the 'fit' between our graduates' training and your practice specialization?

36. very good ☐ adequate ☐ weak ☐

How effective are our graduates at establishing supportive relationships with coworkers and other practitioners?

37. very good ☐ adequate ☐ weak ☐

How do you rate our graduates' understanding of (or compliance with)...

38. professional ethics? very good ☐ adequate ☐ weak ☐

39. a work ethic? very good ☐ adequate ☐ weak ☐

How effective are our graduates at locating, appraising, and applying medical information sources? For example,

40. books and journals very good ☐ adequate ☐ weak ☐ not available ☐

41. electronic databases very good ☐ adequate ☐ weak ☐ not available ☐

42. medical software very good ☐ adequate ☐ weak ☐ not available ☐

How proficient are our graduates at demonstrating these business or management principles?

43. cost awareness very good ☐ adequate ☐ weak ☐

44. service quality very good ☐ adequate ☐ weak ☐

45. billing materials used very good ☐ adequate ☐ weak ☐ not practiced ☐

46. profitability very good ☐ adequate ☐ weak ☐ not practiced ☐

4: Please continue to the final page.

What level of interest do our graduates show toward continuing their professional education?

47. very good ☐ adequate ☐ weak ☐

48. Check 3 of the following characteristics which you believe to be most important in new veterinary graduates:

inquiry ☐ consistency ☐ organization ☐ conscientiousness ☐ fairness ☐

self-discipline ☐ team player ☐ compassion ☐ practicality ☐ enthusiasm ☐

Part 7: Respondent Information

49. **Your practice** equine ☐ large/food ☐ small animal ☐ mixed species ☐ other ☐

50. **Your gender** female ☐ male ☐

51. **Number of recent [University] graduate veterinarians you have observed**

closely in the last 5 yrs: 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ more ☐

52. **Please use this space to tell us how we are doing. For example, what capabilities do you expect of new graduates? What skills do you believe our graduates lack? What knowledge or topics do you think we should teach differently?**

We do appreciate your time, and your answers will be useful to us.

APPENDIX D
EXTANT DATA WORKSHEET

Extant Data Worksheet
I. Factors within the individual performer that influence performance:
Knowledge: Education or training level, preparation or self-directed learning, and job-related experience.
Capacity: The fit between job and personnel, flexibility in scheduling tasks, or use of prosthetic devices.
Motivation: Work ethic; willingness to work for given rewards; attitude, values and professional ethics.
II. Factors within the work environment that influence performance:
Information: Descriptions of expected outcomes, work aids, and feedback about work performance.
Resources: Access to supervisors; time, equipment, and personnel; and work flows.
Incentives: Career development, intrinsic and extrinsic rewards or penalties linked to performance.

Note. The six factors were suggested by Gilbert (1978). The source is included in the References section of the study.

APPENDIX E

INTERVIEW QUESTIONS

Part 1—Interview Questions for Veterinary Needs Assessment

Part 2—Organization Culture Questions

Interview Questions for Veterinary Needs Assessment

Adapting Performance Analysis for Training to Veterinary Education

1. **What are the organization's goals for its graduates?** (Goldstein, 1986; Rossett, 1987, goals)
2. **Do you feel there is a need to review and modify the DVM curricula?** (Burton & Merrill, 1977, comparative need; Rossett, 1987, feelings)
3. **Do you hear about graduates' performance from practitioners?** (Burton & Merrill, 1977, expressed need; Froiland, 1993 and Zangwill, 1994, customer needs)
4. **If they are valid, what do you think is the cause of proficiency deficits?**
(Rossett, 1987, cause)
5. **In which areas of the curriculum have you observed final year students to be least proficient?** (Burton & Merrill, 1977, normative need; Rossett, 1987, actual result)
6. **How do you feel about the proposed changes in curriculum?** (Burton & Merrill, 1977, felt need; Rossett, 1987, feelings)
7. **What should CVM do differently to prepare students for work?** (Burton & Merrill, 1977, future need; Rossett, 1987, solution)
8. **Do you look forward to the proposed curriculum changes?** (Sleezer, 1992, buy-in)
9. **What attitudes or values should become incorporated into the curriculum?** (Rossett, 1987, optimal result)

Thank you. I appreciate your time, and your answers will be useful to this research.

Note. Author citations refer to sources that suggested the kernel ideas (e.g., feelings or causes) that underlie the respective question. The analyst developed the interview questions.

Organization Culture Questions

The following questions suggested by Shapiro and Schall (1990) provided the analyst(s) with insight into the organization's system, culture, rhetoric, and politics. Shapiro and Schall noted that the answers to these questions should be summarized as rules for behavior in the organization under study.

Whom is it necessary to influence in the organization to accomplish personal and organization goals?

What appeal will influence those individuals favorably?

What personal style is most likely to influence those individuals?

What channel is most likely to convey the message in a way that will be influential?

What did the last 10 people promoted (or recognized) in the organization have in common?

What are some 'should' statements that circulate in the organization?

What excuses or justifications are given for behavior?

What kinds of influence behaviors are applauded, condoned, or disdained based on circulating stories?

What is focused on, whose ideas are accepted or rejected, and who allies with whom in the organization?

What is the moral of stories that circulate about influential people or events in the organization?

What marks someone's passage from an outsider to an insider in the organization?

How does the workplace look, and what symbols influence others?

Thank you. I appreciate your time, and your answers will be useful to this research.

APPENDIX F

VERIFICATION WORKSHEETS

Part 1—Verification Worksheet: Observation
and Organization Culture

Part 2—Verification Worksheet: Extant Data

Verification Worksheet: Observation and Organization Culture

Qualitative research commonly employs "respondent verification" to validate the accuracy of the analysts' recordings or summary. By completing the ratings below you are giving feedback to the analyst about the information he gathered for the needs assessment. An observation summary and an organization culture summary is included with this worksheet. Your identity will remain confidential, but the ratings will be reported in the analysts' research report.

Please circle a rating for each question below then sign, date, and mail this worksheet.

1. Based on your reading of "Synopsis of the Organization's Culture," rate the analyst's understanding of the way things get done at the College (i.e., politics, power bases, rhetoric, system and culture).

not very accurate			neutral		very accurate
1	2	3	4	5	

Comments:

2. Based on your reading of "Synopsis of Observations," rate how well the analyst characterized the frame of thinking and actions of the Curriculum Committee (and subcommittee) during the planning of the needs assessment and the revised curriculum.

not very accurate			neutral		very accurate
1	2	3	4	5	

Comments:

(signature) _____ (date) _____

Thank you. I appreciate your time, and your ratings will be useful to this case study.

Verification Worksheet: Extant Data

Qualitative research commonly employs "respondent verification" to validate the accuracy of the analysts' recordings or summary. By completing the ratings below you are giving feedback to the analyst about the information he gathered for the needs assessment. A summary of the information within the preceptorship reports is included with this worksheet. Your identity will be held in confidence, but the ratings will be reported in the analysts' research report.

Please circle a rating for each question below then sign, date, and mail this worksheet.

1. Based on your reading of "Synopsis of the Extant Records" (the summary of 1991-1995 preceptorship reports), rate the analyst's understanding of the motivation, ability, and knowledge of the preceptees.

not very accurate			neutral		very accurate
1	2	3	4	5	

Comments:

2. Rate the analyst's description of the work incentives, resources, and task information available to the preceptees.

not very accurate			neutral		very accurate
1	2	3	4	5	

Comments:

(signature) _____ (date) _____

Thank you. I appreciate your time, and your ratings will be useful to this case study.

APPENDIX G

EVALUATION WORKSHEETS

Part 1—Evaluation Worksheet: Curriculum Committee

Appraisal of the Needs Assessment

Part 2—Evaluation Worksheet: Expert Appraisal of

Adapting PAT to Veterinary Education

Evaluation Worksheet: Curriculum Committee Appraisal of the Needs Assessment

You are being asked as a Committee member to judge the effectiveness of the curriculum needs assessment. The objective of the needs assessment was to discover whether there are deficits in the present curriculum based on (a) a self-assessment of capabilities by a sample of the graduates from 1991-1995 classes and (b) a proficiency appraisal of graduates by employers of graduates from that period. The findings of the needs assessment were made known in a presentation to the Committee and in a report presented to the Associate Dean and made available to the faculty on the local computer network. Your identity and worksheet responses will be kept confidential.

Please circle a response for each of the following questions and date the worksheet:

- 1. How useful was the needs assessment in determining strengths and deficiencies in the DVM curriculum?**

not useful		neutral		useful
1	2	3	4	5

- 2. How useful to the curriculum revision process was focusing the needs assessment on graduates and their employers?**

not useful		neutral		useful
1	2	3	4	5

- 3. How useful were the need assessment findings for making changes to the DVM curriculum?**

not useful		neutral		useful
1	2	3	4	5

- 4. To what extent does the new curriculum reflect the findings of the needs assessment?**

none		neutral		fully
1	2	3	4	5

- 5. To what extent did the needs assessment get the Committee members involved in synthesizing the findings and developing an action plan?**

not involved		neutral		involved
1	2	3	4	5

- 6. The needs assessment could be described as systematic, effective, and economical in discovering curriculum needs (based on graduates' proficiency)?**

disagree		neutral		agree
1	2	3	4	5

- 7. What additional comments do you have about this application of curriculum needs assessment? (Please use the back of this sheet or attach additional pages).**

(date) _____

Thank you. I appreciate your time, and your answers will be useful to this research effort.

Evaluation Worksheet: Expert Appraisal of Adapting PAT to Veterinary Education

You are being asked to assess the effectiveness of the PAT model when used in higher education. PAT was used as a needs assessment frame to determine the adequacy of the institution's veterinary curriculum based on (a) self-assessments of capability by a sample of the graduates from 1991-1995 classes and (b) a proficiency appraisal by employers of the graduates. Information about the study is enclosed to help you rate the model's outcomes. The documents include a draft of the thesis, an explanation of the PAT model, the final report prepared for the College, synopses of the findings, and the completed PAT worksheets. As stated in the consent form, your name will be held in confidence, but the ratings you provide will be made public in the study.

Please circle a response to each of the following questions and sign the worksheet:

1. How useful was PAT for determining strengths and deficiencies in the College's DVM curriculum?

not useful		neutral		useful
1	2	3	4	5

2. How useful to the curriculum needs assessment was the inclusion of customers in PAT?

not useful		neutral		useful
1	2	3	4	5

3. How useful were the needs assessment findings for making changes in the veterinary curriculum?

not useful		neutral		useful
1	2	3	4	5

4. To what extent were the outcomes of the needs assessment influenced by the characteristics of customers, the organization, decision makers, and the analyst?

no influence		neutral		influenced
1	2	3	4	5

5. To what extent did using PAT involve the CVM's decision makers in the needs assessment process?

not involved		neutral		involved
1	2	3	4	5

6. How does the PAT model compare with other needs assessment models?

unfavorably		neutral		favorably
1	2	3	4	5

7. What comments do you have about this application of the PAT model?
(Please use the back of this sheet or attach additional pages).

(name) _____ (date) _____

Thank you, I appreciate your time, and your answers will be useful to this research effort.

APPENDIX H
NEEDS ASSESSMENT REPORT TO THE CVM

Part 1—Distribution of Proficiency

Review Instruments

Part 2—Tabulated Data

Part 3—Completed Extant Data

Worksheet

Part 4—Findings of the Stakeholder

Needs Assessment

Distribution of Proficiency Review Instruments

By species emphasis										
Graduates						Employers				
Region	Eq	L / F	SA	Mix	Total	Eq	L / F	SA	Mix	Total
East	2	1	15	11	29	5	1	12	8	26
South	3	3	16	12	34	5	1	8	16	30
Central	5	4	24	25	58	10	5	56	58	129
West	1	1	16	7	25	7	2	7	8	24
Total	11 7%	9 6%	71 49%	55 38%	146 100%	27 13%	9 4%	83 40%	90 43%	209 100%
By gender										
Graduates				Employers						
Region / species	Females	Males	Total	Females	Males	Total				
East	18	11	29	2	24	26				
South	23	11	34	1	29	30				
Central	23	35	58	11	118	129				
West	12	13	25	3	21	24				
Total	76	70	146	17	192	209				
Equine	7	4	11	1	27	28				
Large / food	4	5	9	0	9	9				
Small	39	32	71	11	71	82				
Mixed	26	29	55	5	85	90				
Total	76 52%	70 48%	146 100%	17 8%	192 92%	209 100%				

Note. Geographic regions where graduates were employed and surveyed: East = CT, DE, IL, IN, KY, MA, MD, ME, MO, NH, NJ, NY, PA, VA, WI, WV; South = AL, AR, FL, GA, NC, SC, TN, TX; Central = KS, NE, ND, OK, SD; West = AK, AZ, CA, CO, ID, MT, NM, NV, OR, UT, WA, WY. Column headings indicate species emphasis: Eq = equine; L/F = large or food animals; SA = small animals; Mix = mixed species practice.

Tabulated Data

Item	Graduates (n=146)					Employers (n=209)				
#	VG	A	W	NP	N/U	VG	A	W	NP	N/U
1	44 45%	49 51%	2 2%	0	2 2%	52 39%	74 56%	7 5%	0	0
2	55 57%	40 41%	0	0	2 2%	47 35%	76 57%	10 8%	0	0
3	39 40%	49 51%	7 7%	0	2 2%	41 31%	78 59%	14 11%	0	0
4	48 49%	42 43%	5 5%	1 1%	1 1%	34 26%	67 50%	24 18%	7 5%	1 1%
5	61 63%	32 33%	2 2%	1 1%	1 1%	36 27%	67 50%	23 17%	6 5%	1 1%
6	35 36%	44 45%	15 15%	2 2%	1 1%	15 11%	45 34%	62 47%	10 8%	1 1%
7	52 54%	35 37%	6 6%	1 1%	2 2%	54 41%	61 46%	15 11%	3 2%	3 2%
8	30 31%	55 57%	8 8%	2 2%	2 2%	40 30%	69 52%	19 14%	5 4%	0
9	48 51%	41 42%	7 7%	0	0	49 37%	66 50%	17 13%	0	1 1%
10	49 51%	41 42%	7 7%	0	0	36 27%	64 48%	28 21%	4 3%	1 1%
11	56 58%	33 34%	5 5%	2 2%	1 1%	47 35%	59 44%	17 13%	8 6%	2 2%
12	58 60%	35 36%	3 3%	1 1%	0	53 40%	70 53%	3 2%	6 5%	1 1%
13	31 32%	51 53%	9 9%	4 4%	2 2%	29 22%	71 53%	20 15%	12 9%	1 1%
14	24 25%	64 66%	9 9%	0	0	36 27%	83 62%	7 5%	5 4%	2 2%
15	28 29%	55 57%	13 13%	1 1%	0	36 27%	74 56%	9 7%	12 9%	2 2%

(table continues, legend at end of table)

Item	Graduates					Employers				
#	VG	A	W	NP	N/U	VG	A	W	NP	N/U
16	24 25%	22 23%	6 6%	44 45%	1 1%	26 20%	48 36%	11 8%	37 28%	11 8%
17	62 64%	33 34%	2 2%	0	0	57 43%	69 52%	6 5%	0	1 1%
18	68 70%	28 29%	1 1%	0	0	54 41%	69 52%	9 7%	0	1 1%
19	52 54%	42 43%	3 3%	0	0	61 46%	59 44%	12 9%	0	1 1%
20	48 50%	37 38%	11 11%	1 1%	0	38 29%	71 53%	21 16%	1 1%	2 2%
21	25 26%	37 38%	21 22%	13 13%	1 1%	32 24%	79 59%	12 9%	10 8%	0
22	36 37%	49 50%	12 12%	0	0	49 37%	75 56%	8 6%	1 1%	0
23	9 9%	51 53%	28 29%	8 8%	1 1%	24 18%	71 53%	18 14%	17 13%	3 3%
24	55 57%	38 39%	4 4%	0	0	62 47%	66 50%	1 1%	4 3%	0
25	25 26%	40 41%	27 28	5 5%	0	32 24%	79 59%	15 11%	6 5%	1 1%
26	29 30%	54 56%	13 13	1 1%	0	36 27%	77 58%	10 8%	10 8%	0
27	29 30%	52 54%	14 14%	2 2%	0	33 25%	72 54%	25 19%	2 2%	1 1%
28	52 54%	37 38%	6 6%	1 1%	1 1%	27 20%	67 50%	36 27%	2 2%	1 1%
29	44 45%	50 52%	3 3%	0	0	44 33%	84 63%	3 2%	2 2%	0
30	29 30%	60 62%	6 6%	1 1%	1 1%	23 17%	86 65%	21 16%	3 3%	0
31	41 42%	47 48%	8 8%	0	1 1%	22 17%	89 67%	20 15%	2 2%	0

(table continues, legend at end of table)

Item	Graduates					Employers				
#	VG	A	W	NP	N/U	VG	A	W	NP	N/U
32	35 36%	56 58%	6 6%	0	0	50 38%	59 44%	23 17%	1 1%	0
33	39 40%	38 39%	18 19%	1 1%	1 1%	41 31%	65 49%	16 12%	10 8%	1 1%
34	42 43%	49 51%	5 5%	0	1 1%	52 39%	70 53%	9 7%	2 2%	0
35	36 37%	47 48%	13 14%	1 1%	0	47 35%	72 54%	13 10%	1 1%	0
36	36 37%	42 43%	19 20%	0	0	38 29%	70 53%	23 17%	0	2 2%
37	59 61%	32 33%	6 6%	0	0	62 47%	58 44%	11 8%	0	2 2%
38	74 76%	22 23%	1 1%	0	0	83 62%	41 31%	9 7%	0	0
39	78 80%	18 19%	1 1%	0	0	68 51%	42 32%	23 17%	0	0
40	61 63%	32 33%	4 4%	0	0	72 54%	57 43%	4 3%	0	0
41	12 12%	17 18%	45 46%	23 24%	0	18 14%	50 38%	17 13%	48 36%	0
42	9 9%	15 15%	46 47%	27 28%	0	15 11%	53 40%	23 17%	42 32%	0
43	31 32%	37 38%	28 29%	0	1 1%	20 15%	44 33%	67 50%	0	2 2%
44	55 55%	34 35%	9 9%	0	1 1%	44 33%	68 51%	19 14%	0	2 2%
45	23 24%	36 37%	31 32%	7 7%	0	12 9%	47 35%	64 48%	9 7%	1 1%
46	16 16%	38 39%	32 33%	11 11%	0	10 8%	44 33%	69 52%	8 6%	2 2%
47	71 73%	21 22%	3 3%	0	2 2%	79 59%	43 32%	11 8%	0	0

(table continues, legend at end of table)

48. Graduates (top row) Employers (bottom row)										
Inquiry	Consistency	Organization	Conscientious	Fairness	Self-Discipline	Team-work	Compassion	Practicality	Enthusiasm	N/U
24 25%	13 13%	31 32%	38 39%	4 4%	41 41%	27 28%	29 30%	45 46%	29 30%	10 10%
24 18%	19 14%	30 23%	82 62%	6 5%	39 29%	40 30%	27 20%	53 40%	67 50%	12 9%
49. Graduates (top row) Employers (bottom row)										
Equine		Large / food		Small		Mixed		Other		N / U
7 7%		7 7%		45 46%		35 36%		1 1%		2 2%
14 11%		4 3%		57 43%		58 44%		0		0
50. Graduates (top row) Employers (bottom row)										
Female				Male				N / U		
43 44%				53 55%				1 1%		
10 8%				121 91%				2 2%		
51. Graduates (top row) Employers (bottom row)										
1 year		2 years		3 years		4 years		5 years		N / U
21 22%		24 25%		22 23%		15 15%		13 13%		2 2%
50 38%		36 27%		19 14%		15 11%		12 9%		1 1%
52. Graduates' area of emphasis at CVM										
Equine		Large / food		Small		Mixed		N / U		
16 16%		14 14%		26 27%		40 41%		1 1%		

Note. Numbered item indicates competency on the proficiency review instruments. Columns indicate the following proficiency ratings: VG=very good; A=adequate; W=weak; NP=not practiced or not observed; N/U=no response to survey item or unusable response.

Completed Extant Data Worksheet

I. Factors within the work environment that influence performance.

Information: Descriptions of expected outcomes, work aids, and feedback on performance

One-third of the preceptors had no formal programs for students. Hospitals and private practices with multiple doctors were less likely to provide the expected learning environment than small clinics. Many reports indicated little or no opportunity for 'hands on' treatment, only observation or custodial tasks. Input was not encouraged by the doctors, and clinicians did not discuss cases with the preceptees. Such clinics typically lacked meetings to inform the staff how they were performing. Those students received no useful feedback on their learned skills. At supportive clinics, veterinarians treated preceptees as doctors, offered constructive criticism away from clients, and included them in staff meetings. These clinicians engaged the extern in dialogue on case management and wanted to hear about new medicine and techniques being taught. Humor was often reported as tacit form of professional acceptance, propinquity, and corrective feedback.

Resources: Routinized work flow and access to supervisors, time, equipment, and personnel

Fully staffed clinics allowed the veterinarians to focus on cases while technicians spoke with customers and handled their animals. Professionalism in clinicians was reflected in staff performance and clientele attitude. The practices reported as most effective scheduled morning meetings to plan the day's activities.

Diagnostic instruments were commonly mentioned as an important resource; e.g., ECG, sonogram, gas anaesthesia, blood analysis, and animal handling equipment. Some offices used special software for case management, billing, and calling customers.

A few preceptors were disciplinarians. Sometimes there was conflict among doctors over the assignment of staff. Most preceptors expected the preceptees to have the initiative to 'find something to do.'

Incentives: Career development, intrinsic or extrinsic rewards, and penalty linked to performance

A few clinics paid technicians' salaries to preceptees, and some provided lodging. But most paid no stipend or meal allowance. Preceptees occasionally found themselves competing with part-time veterinarians for tasks to do.

Male hosts were reported to be more tolerant and willing to teach than were female hosts. Young doctors were interested in discussing their cases with externs. Technicians seemed interested in learning more about the veterinarian's job.

Most preceptees believed the preceptorship was worth the cost in exchange for gaining experience. Students learned to interact with customers, handle emergencies, saw the business side of animal medicine, and found "an opportunity to think."

II. Factors within the individual performer that influence performance.

Knowledge: Education or training level, preparation or self-directed learning, and related experience

All preceptees had at least three years of veterinary school, including third year clinical rotations, before beginning their externships. Some students express feelings of being under trained for the externship. A few students mentioned feeling at ease handling animals, growing up on farms or working at clinics before starting veterinary school.

Capacity: Fit between job and personnel, flexibility in scheduling or tasks, and use of prosthetic devices

The externships involved long hours of work—typically 12 hours daily in clinics or hospitals and up to 20 hours for 'road vets.' There were few complaints about the working time at supportive clinics. About half of the reports stated that the preceptee was allowed to perform whatever surgery he or she demonstrated capability in doing.

Motivation: Work ethic, professional ethics, willingness to work for given rewards, and values

Preceptees often mentioned the objectives of their preceptorship; e.g., (a) get more experience practicing quality medicine, (b) observe a well run private practice, (c) learn how to deal with emergency cases, and (d) gain knowledge about a species. The preceptorship gave them the confidence "to practice on one's own." Students wrote they were motivated at clinics where they were treated as doctors by customers and the staff or where the host was expert and willing to share his/her knowledge.

Analysis of Extant Data

The objective of looking at the extant records was (a) to confirm the findings of the proficiency review (survey) data and (b) to uncover additional salient characteristics about the customer. Students' observations taken from the extant records helped the analyst to understand some of the proficiency ratings from the surveys. For example, high self-ratings of proficiency by graduates suggests that their continued confidence reflects competency in performing entry- and journeyman-level tasks. More modest ratings of graduates by employers reflect their feelings that many graduates have not tackled enough hard cases to be rated 'very good.'

Summary of the work environment. Students who were accepted as colleagues by the practice host, given constructive feedback, and found opportunities to perform and learn rated the preceptorship experience highly. Some graduates said the experience was valuable and should be made longer. The students could see that the preceptors (i.e., employers) had characteristics that shaped the work environment. Preceptors who acted as mentors were tolerant, helpful, trusting, ethical, communicative, and learning-oriented. Autocratic preceptors were closed, authoritative, and some exploited the preceptees. Two preceptees reported withdrawing from preceptorships that they considered untenable due to personality differences.

A few student reports commented that having access to the 'proper' equipment and facilities encouraged them toward inquiry and self-directed learning.

Summary of individual performer factors. Both students and recent graduates expressed astonishment at the amount of learning that lay ahead of them and how much of the curriculum content was not needed in daily practice. Those students who reported taking advantage of extracurricular opportunities that the College offered expressed confidence at the tasks they were given to do. Many students were excited about the nearness of graduation and the prospect of a career, so had not before thought the work life of a professional veterinarian.

Synopsis

The graduates surveyed in the needs assessment had written preceptorship reports when they were students. The analyst characterized preceptees as (a) students who were confident of their ability and (b) students who were apprehensive. The confident ones often had farm backgrounds or had worked in veterinary clinics before going to veterinary school. All students wrote of being eager to begin their careers. Although there were no specific measurements for job satisfaction, the analyst conjectured that graduates who had served externships in supportive environments more often rated their skills higher than those who had received no support during the preceptorship. Preceptees who received little direction from the preceptor probably doubted that they were prepared for work.

The analyst believed students' reports mostly were biased in favor of the curriculum. Many graduates expressed (in the proficiency review instruments) self-confidence in diagnosis, surgery, and customer relations through practice on the job. As students they may have felt anxious because they had not been drilled in those practices. Therefore, the areas in which graduates reported weakness may not have been covered thoroughly in the curriculum nor experienced in the externship.

The Director of Preceptorship Programs commented to the analyst that he planned to strengthen future preceptorship reports by asking students to examine and note their individual preparedness for the preceptorship. In only three of the 536 reports did students reflect upon their knowledge, skill, and ability in connection with the demands of the externship. Here are three explanations for the lack of self-examination: First, the analyst remembered from his engineering education that scientists are not encouraged to be introspective; it is 'unprofessional.' Second, the majority of preceptees may have felt that they were ready for the externship. Third, the Director of Preceptorship Programs told the analyst, and students also knew, that reports which indicated weak areas were looked at closely, and those students were asked to do extra work before being passed for graduation.

The extant records characterized the nature of preceptors better than the strengths and weaknesses of preceptees. Two ideas may explain, in part, why some employers rated graduates lower in the proficiency review than graduates' rated themselves: First, the hosts came from different veterinary schools and had developed their own principles and methods through experience. Second, preceptors some wanted the externs to 'hit the ground running' without their having to take time to train them.

Note. The following excerpt is taken from the needs assessment report given to the CVM administrators and decision makers July 1, 1996. The introduction and methodology have been excluded because they are essentially the same as Chapters I and III of the dissertation.

Findings of the Stakeholder Needs Assessment

The findings of this research came principally from the survey instruments mailed to practitioners. Secondary input came from preceptorship reports written by the graduates when they were students. Examples of the collected data can be found at the end of this report.

Findings from the Survey Instruments

Ninety-seven recent graduates returned their survey instrument (a 66% response), and 133 employers returned usable instruments (a 64% response). The results are summarized below by emphasis area. The data are tabulated by practitioner group in the addenda to this report. The emphasis areas -- foundation knowledge, clinical practice, preventive practice, diagnostic practice, therapeutic practice, and practice management -- correspond to sections within the research instruments, and numbered items refer to assessment criteria in the instruments.

Foundation knowledge (assessment items #1 to 3). Graduates and employers were in agreement on the assessment of core knowledge and patient management abilities. Nearly half of each group voted graduates to be adequate, and over one-third rated graduates as very good. More than half of the graduates ranked their clinical reasoning as very good, while half of the employers ranked it adequate.

Clinical practice (#4 through 10). Employers rated most graduates as being adequate in these criteria; although nearly as many employers rated graduates as very good as rated them adequate in speech communication (#9) and client fellowship (#7). Estimating costs for the customer (#6) was one of the two criteria most often rated weak by employers. Graduates, on the other hand, chiefly rated themselves as very good in each criteria except clinical emergencies (#8). When graduate responses were analyzed by track, only one large animal respondent rated himself as very good at emergencies.

Preventive practice (#11 through 16). Graduates and employers were in agreement on the assessment of graduates' epidemiology knowledge, zoonotic practices, and disease prevention program management; more than half of each population rated graduates as adequate on these criteria, and one quarter rated them very good. The groups were divided on selecting vaccines (#11), controlling parasites (#12), and minimizing trace drugs in food animals (#16). Graduates rated themselves as very good while employers rated them as adequate in these criteria.

Diagnostic practice (#17 through 27). Graduates were very confident of their abilities to perform and interpret examinations. Nearly two-thirds rated themselves as being very good at patient history (#17), signalment (#18), and physical work-up (#19). Employers rated the majority of graduates as adequate. Graduates were conservative assessing their proficiency in interpreting clinical tests (#21 through 27); most agreed with the employers in rating their laboratory analysis as adequate. One exception was parasitology where 59% of graduates and 48% of employers assessed the graduates as being very good. When graduate responses to the above items were analyzed by track, none of the large animal practitioners rated their

diagnostic imaging skills as very good, but 83% believed their skills were adequate.

Therapeutic practice (#28 through 35). The majority of employers rated graduates as adequate in patient management and pharmacology. Graduates generally were in agreement with employers. One exception was proficiency in performing common surgeries (#28). Small animal, large animal, and mixed species graduates rate themselves as very good more often than did equine graduates.

Practice management (#36 through 48). Graduates and employers generally were in agreement that graduates performed very well in their relations with coworkers (#37), ethics (#38 and 39), fit between species training and their practice emphasis (#36), use of medical journals (#40), and interest in continuing their education (#47). The two populations differed in their appraisal of graduates' skills in using on-line veterinary information and diagnostic software. Possibly, graduates more often rated themselves as being weak in these areas because they were more aware of the state of the technology than were employers. Graduates largely agreed with employers that more exposure to business and management was needed. Employers rated graduates as weak in cost awareness (#43), billing accuracy (#45), and understanding profitability (#46). Graduates and employers did not provide comments on all of the deficit criteria, but the practice management ratings were supported by numerous comments. Item #48 attempted to determine which values practitioners held as worthy. The ten characteristics of professional veterinary practice chosen by the curriculum committee in 1992 were included on the survey instrument. Employers most often selected conscientiousness (62%), enthusiasm (50%), and practicality (40%), while graduates choose practicality (46%), self-discipline (42%) and conscientiousness (39%).

Respondent information (#49 through 51). Since there were many more small animal and mixed species graduates than equine and large animal graduates, more responses were received from those groups. When a sampling of the assessment criteria was analyzed by species emphasis, no overall pattern of animal group competency was observed. When those criteria were analyzed by length of practice, graduates out of school five years rated themselves very good more frequently than the other year-groups. However, more responses were received from each of the year-groups having fewer than five years in practice. Also, slightly more responses were received from women than from men. When a sampling of the assessment criteria were analyzed by gender, the responses were closely matched across ratings, suggesting that neither sex possessed a distinctive competency in any of the evaluation areas. This finding was in agreement with that of previous studies (Frazier & Howell, 1991; Stone, et al., 1992; Wimberley, 1991).

Item #52 attempted to determine which sector of the market has been successful in attracting CVM graduates. While it was not surprising that the small animal practice placed highly, it was a surprise to learn that more graduates were practicing in that sector than had trained specifically for it. Seven of 16 equine graduates indicated they routinely practiced on small or mixed species, 10 of 14 large/food animal graduates practiced primarily on mixed species, and four of 26 small animal graduates responded that they were engaged in mixed species practice. Over one-third of the responding employers had employed one CVM graduate in the last five years (employer survey #51), and one quarter of the employers had supervised two graduates. Ninety-one percent of the responding employers were males (#50). The table "Distribution of the Survey Instruments" in the appendix to this report illustrates the distribution by species emphasis and gender.

Respondent comments (graduate criterium #53, employer criterium #52). The graph "Distribution of Needs from Practitioners' Comments" in the report appendix displays practitioners' needs as expressed in their comments. The needs most frequently stated (clinical practice, surgery practice, and understanding business) were common to both graduates and employers. Clinical practice needs included (a) expediency in daily practice; (b) knowledge of alternative treatments; (c) experience in managing emergencies; (d) familiarity with diseases common to practice species; (e) and the performance and interpretation of laboratory tests. Likewise, recommendations related to surgery also reflected graduates' needs for expediency and more "hands on" practice. Employers emphasized that graduates need business acumen since it meant the profitability of their practice; e.g., cost of supplies, new equipment finance, and volume of business. Graduates indicated they needed knowledge of finance and management in anticipation of future partnerships or proprietorships. To a lesser extent, both populations commented on the need for better human relations training in graduates and for policy considerations in the DVM program; e.g., the use of practitioners as adjuncts, higher admission standards, interviews for DVM candidates, and changes in the design of the curriculum. Less frequent comments evaluated specific courses.

Findings from the Preceptorship Reports

The analyst read 536 preceptorship reports (most students conducted two preceptorship tours) to gather confirming information about graduates' strengths and weaknesses. More than two-thirds of the preceptees reported that they were allowed "to do as much as they felt confident" doing during their individual internships. In about one-half of those instances, the hosts were pleased to teach students while working. The other half expected students to come to them with sufficient training, or the host would show them "one time" and expect them to perform that operation thereafter. The remaining one-third of the preceptorship reports indicated that students were allowed only to watch the resident practitioners operate. Two of the survey comments stated that the animal shelter rotations gave them "enough experience" to be able to participate in the preceptorship activities or to pass employment trials. While many practitioners urged including more live animal surgery and treatment experience in the DVM curriculum, they gave no suggestions on how to implement those requests other than to allow students to perform the work that clinicians now do.

Summary of the Needs Assessment Findings

Despite the serious, occasionally emphatic, tone of the comments, tallies of the assessment topics revealed more 'very good' ratings than 'weak' ratings. Most of the responses followed two patterns. Graduates rated their abilities as very good while employers rated those same abilities as adequate. In the second pattern, graduates and employers were in agreement upon recent graduates' abilities with adequate as the median rating. The graphs at the end of the report illustrate the findings using Pareto analysis.

Overall, graduates seem confident in their veterinary medical abilities. Graduates rated themselves as adequate or better in 40 assessment topics across the six emphasis areas: (a) work and professional ethics, (b) lifelong learning, (c) patient examination, (d) applying information found in professional journals, (e) human relations, and (f) parasitology. The area of clinical practices showed more positive ratings than other emphasis areas. These perceived skills are displayed in the graph "Graduates' Reported Strengths" in the appendix of this

report. Employers rated graduates as very good or better in 41 proficiency topics. The ratings mostly supported graduates' self-appraisals (see graph "Graduates Strengths Reported by Employers" in the section following this report).

The graph "Graduates' Reported Weaknesses" in the report appendix illustrates 10 practice weaknesses reported most often by graduates. The most frequent deficits were on-line information retrieval and medical software skills followed by knowledge of business methods. The remaining curriculum deficits dealt with laboratory testing and pharmacology. The graph "Graduates' Weaknesses Reported by Employers" in the appendix illustrates the weaknesses indicated most often by employers. The four outstanding deficits in practice management (understanding profitability, cost awareness, completeness in billing, and case cost estimates) had to do with basic business. Those weaknesses were also the four criteria least often rated very good by employers. The remaining deficits dealt with surgical techniques, writing, diagnostic imaging, client relations, and pharmacological selection. It is not surprising that some skill deficits were expressed by both populations: practice management, interpreting laboratory results, and the legal use of pharmacological agents.

Conclusion to the Stakeholder Need Assessment

The results of the needs assessment can be reduced to six conclusions:

The College should emphasize baseline knowledge. Students often chose a species track that appealed to them while in school then discovered they could not find work in that area due to a lack of opportunity or the inability to relocate. They often took employment in the more common small species practice. Although licensed graduates can operate on for all species, some faculty doubted whether they were sufficiently trained to practice with competence outside an emphasis area. It is our responsibility to the student and to animal owners that the DVM curriculum provide sufficient 'pan-species' knowledge so the new graduate can practice general veterinary medicine safely outside her or his emphasis area, if need be, during the first few years of their employment.

The College should improve school-to-work knowledge. The contrast between academic veterinary science and practicing veterinary medicine may explain, in part, the misalignment between graduates' perceived knowledge and the needs expressed by practitioners. Practicing veterinary medicine is an enterprise, and the clinician's emphasis was on day-to-day operations including cost control, volume of business, and public relations in addition to quality animal care. Practitioners' comments indicated that medical theory, common infirmities, and practical treatment ought to be integrated within each emphasis area throughout the DVM curriculum. In addition, graduates strongly expressed the desire for a course in business management. The present practice management course attempts to introduce basic business concepts, and serves an important function in the curriculum.

The College should build more value into its "products". Presumably, employers hire recent graduates in place of more experienced practitioners because graduates possess newer knowledge about treatments and instruments, and they are available at a competitive wage. However, veterinary proprietors seemed unwilling to accept the concept of a learning curve. Graduates of CVM were praised for their work ethic; yet, their employment could have been a net cost to their employers during the first one or two years following graduation (see Long, 1996). Weaknesses in animal handling and surgery (motor neural behavior), clinical chemistry and pharmaceutical formulary (intellectual knowledge), and signalment, diagnostics,

and response acumen (cognitive knowledge) represent distinct forms of learning, but the weaknesses in each of those areas can be reduced through drill. Modifying the curriculum to provide increased exposure to common clinical tasks could enhance the initial proficiency (and the perceived value) of each succeeding graduate.

The College can improve the worth of the preceptorship experience. The preceptorship can be an opportunity to witness capable practice management and to receive instruction in live animal surgery and treatment if the student chooses the preceptor carefully. However, the DVM curriculum must provide the extern with relevant instruction and sufficient manual practice prior to the preceptorship so he or she is capable of joining the preceptor in common practices while they are in the field.

The College should continue post-hoc performance assessment. Since graduates and employers can contribute meaningful information about the content of a curriculum, the revised DVM program will benefit from constructive feedback on the performance of each graduating class (as measured by their employers) eight to 12 months after starting work. Exit interviews with matriculating students would provide additional curriculum feedback as well as information about graduates' initial employment.

The College can offer desired topics in education extension. The knowledge deficits also point to areas of emphasis in continuing education. In addition, they should be well received as speaking topics at professional conferences. Veterinary outreach programs could also benefit from these findings by offering instruction in nonclinical subjects like improving practice management and financial decision making. Some of the employer comments suggested that veterinary proprietors might benefit from exposure to personnel management methods (employee selection, performance evaluation, and profit sharing plans) and quality service topics.

This research showed that most employers were pleased with the quality of CVM's graduates. A majority of the graduates indicated they received a quality veterinary education. Through their comments both types of practitioners revealed a common desire to redesign the present curriculum in a way that would promote more 'learning while doing' and 'everyday medicine' to make the school-to-work transition more realistic.

The College of Veterinary Medicine has human and physical resources which can support an updated curriculum that would accomplish the broad goals of experiential learning and pragmatic instruction, emphasized by both practitioner populations, and the emphasis topics mentioned by graduates. If the skill deficits are as important as the skill strengths, for the purpose of curriculum evaluation, then weak abilities should be looked at for inclusion as elements in the syllabus, in clinical practice, and in the instructive rounds. With the full support of the administrative and teaching faculty, the Doctor of Veterinary Medicine program at [the University] can produce veterinarians suited for service in the 21st Century. They will be capable animal health clinicians who are also knowledgeable business managers, responsible citizens, and lifelong learners.

Note Sources are cited in the Reference chapter.

APPENDIX I
SYNOPSIS OF OBSERVATION

Synopsis of Observation

The analyst's perceptions of the CDC's cognitive frame, behaviors, and salient characteristics from observations of the needs assessment and curriculum revision processes.

Philosophy: The members perceived professional education as an opportunity to acquire foundation knowledge that would prepare students to work or study in many sectors of the veterinary medical profession. This philosophy was the tacit goal of the DVM program.

Mission: The members agreed that the task of curriculum revision was intended to (a) reduce classroom and credit hours for the curriculum, (b) consolidate course matter into basic knowledge that was relevant to practice without being redundant, (c) sequence courses for easier learning, (d) teach mixed species practice, and (e) prepare graduates for employment in the sectors of veterinary medicine. The members were concerned whether a new curriculum would be successful due to (a) the need for cooperation between departments and among faculty; (b) human resources that were available; specifically, problems scheduling instructors' time; (c) the established culture of didactic teaching; and (d) the time needed to design a new curriculum.

Politics: The analyst saw no evidence of conflict or posturing among the members. The Chair informed the members and some faculty that the Dean had requested the curriculum revision and was pushing for its completion. The Committee had no authority, so the CDC had to rely upon referent power to achieve its mission.

Values: Support of institutional goals, expertise, openness, cooperation, enthusiasm, and humor were regarded as influential personal traits. Expertise and competency were viewed as professional traits. The analyst saw no bias among the CDC members that would characterize them as supporting principally a clinical sciences or basic sciences agenda.

Culture: Teaching, collegiality, and goal achievement were important to this group of faculty. However, the democratic process slowed decision making within the CDC. The analyst noted in the design of the needs assessment that issues would be raised but discussion would drift, and a problem would go unresolved until a later session. Also, the CDC often vacillated on design issues, moving from a former decision to a new, different decision in a later meeting. Recent events within the College often was the motivator of change.

Rhetoric: The Dean and many faculty were ready for curriculum revision. Commitment to changing the curriculum was stronger among members after conducting the student interviews than following the analyst's presentation of the customer needs. Commitment increased among teaching faculty after the proposed curriculum began to be promoted, by word of mouth, among individual teaching faculty. The analyst's interviews also may have influenced some instructors.

Organization system: The design of the system—the process of teaching, clinical rotation, and research—worked to minimize interaction between the clinical and basic sciences groups. The basic sciences faculty rarely saw clinical cases, and their teaching focused on producing new knowledge. The basic sciences faculty mostly employed a didactic teaching style with detailed knowledge as the outcome. The clinical faculty typically favored the Platonist learning style characterized by case study, group problem solving, and hands-on experience.

The CDC brought together nine faculty from the two groups to develop a curriculum that would be workable for both parties. The members were acquainted with how the DVM program worked, something other faculty said they did not fully understand. When resistance arose, such as objections to the proposed curriculum by faculty who were not part of the CDC, the common approach was to maneuver around the problem and toward the project goal.

Analysis

Because the decision makers in this study were charged with the responsibility of developing a revised curriculum, it was not unusual that they should be active in the needs resolution process. Several events characterized the decision makers: First, the members set aside the feelings of their respective departments and worked together on the new curriculum. The author expected some confrontation among members as part of the normal group working process (Scholtes, 1990), but he saw none. Second, humor was probably as important in completing the needs assessment as the professional work ethic. Humor engaged the members in the process and gave them incentive. Third, issues were seldom final in this group until someone acted upon the most recent disposition. Thus, even when there was wide agreement on what to do, decisions to act could change following a future event or a new argument. The analyst observed these decision maker characteristics over a nine-month period.

Other observations led the analyst to draw inferences to other need assessment situations. First, the business language used by the analyst and practitioners may not have been understood by some of the members. The implication is that jargon used by customers or line employees may differ from that used by the decision makers, and legitimate needs can go unheeded. Second, earning knowledge about curriculum needs proved to be a more powerful motivator among members than receiving empirical data from the analyst. Thus, it was important that decision makers were involved in data gathering as well as in needs assessment negotiation and prioritization. Third, executive commitment to the change process was crucial to success. The Dean did not actively promote the new curriculum after its approval. Seeing his reticence, some department heads dismissed the importance of developing the new courses, and one instructor told the analyst the program was losing momentum.

The analyst concluded, intuitively, that six milestones were critical to the smooth completion of the curriculum review and revision process. First, it was important to define the purpose of the DVM degree. A curriculum's content will vary depending upon what was meant to be produced (practitioners, civil servants, or academicians). Second, the "balance of commitment"—the mix of clinical and basic sciences courses—had to be framed in terms of knowledge outcomes as well as credit hours. Third, the conceptual design of the curriculum had to be laid out in terms of specific courses fulfilling the balance of commitment. Fourth, evaluation criteria for the DVM program ought to be defined as soon as the program's content is decided, since it will be evaluated in the future. Fifth, the proposed curriculum must be presented to the faculty for review, and the CDC must solicit their feedback. Sixth, an executive figure—in this case, the Dean—must publicly endorse the proposed curriculum and promote it through the development and trial periods. The CDC completed the second, third, and fifth steps, but the analyst did not observe the CDC address the first and fourth milestone. The clinical faculty may perform those tasks on their own as they flesh out the design of the systems courses in 1997. The sixth milestone also did not occur.

APPENDIX J
SYNOPSIS OF FACULTY INTERVIEWS

Synopsis of the Faculty Interviews

I. Teaching Faculty

The Curriculum Development Committee suggested seven instructors to interview. Three taught the clinical sciences and four taught the basic sciences. None of the interviewees were members of the CDC. The following questions were asked of all instructors:

1. What are the organization's goals for its graduates? (Goldstein, 1986; Rossett, 1987, goals)

Findings: Both clinical and basic sciences faculty said the primary objective was to produce capable veterinarians. Two faculty emphasized that the curriculum should focus on core knowledge of veterinary medicine over clinical techniques. Two other faculty agreed and gave a reason for that goal: Since the number of veterinarians has been increasing, the market for private practitioners may be nearing saturation, and graduates may find they have to switch to public or corporate service to become employed. Three instructors said the program should be aimed at producing practitioners.

Analysis: The comments displayed the organization's system and culture. Most graduates and employers agreed with faculty on the purpose of the program—to provide future veterinarians with a scientific background for problem solving—they also indicated that the curriculum should emphasize clinical methods more than detailed biological knowledge. The lack of consensus among instructors indicated that the College needed a formal mission statement to unite everyone's activity.

2. Do you feel there is a need to review and modify the DVM curricula? (Burton & Merrill, 1977, comparative need; Rossett, 1987, feelings)

Findings: The faculty were unanimous that a review of the curriculum was necessary, and most thought the time had come for revising it. The reasons they gave were (a) excessive repetition of knowledge among courses, (b) too much specialized science and surgery knowledge was being taught, (c) students often did not have the full prerequisite knowledge as expected, (d) growth in knowledge within the last decade, and (e) the program should prepare graduates for careers other than private practice. Some faculty proposed solutions including (a) integrating the surgery and science courses, (b) eliminating much of the specialized knowledge, (c) using a team of authorities to decide on the content, and (d) reviewing the prerequisite material needed for the DVM program.

Analysis: Organization rhetoric is evident in the responses. The fact that the curriculum had not changed in 10 years (although some faculty have experimented with team teaching on their own) indicated that change did not occur here except by strong leadership (organization politics) or majority support (organization culture). Some comments from the proficiency instrument expressed similar desires to revise the curriculum and similar recommendations for improving it.

3. Do you hear about graduates' performance from practitioners? (Burton & Merrill, 1977, expressed need; Froiland, 1993 and Zangwill, 1994, customer needs)

Findings: The five faculty of the basic sciences said they had no regular contact with employers and no reliable feedback on graduates' performance. The two clinical faculty had frequent contact with practitioners but had heard no 'serious complaints.'

Analysis: Lack of contact with the field was part of the organization system and may explain, in part, why the basic sciences courses contain knowledge that graduates do not use (according to survey responses). The clinicians' opinions reinforced the findings of the proficiency survey; that the majority of employers had no complaint about the quality of the College's graduates.

4. If they are valid, what do you think is the cause of proficiency deficits? (Rossett, 1987, cause)

Findings: The two clinicians agreed that students need more clinical experience in small animal medicine and surgery. Faculty who did not hear from employers could only offer explanations for academic weakness: The College may have admitted candidates who were not prepared for learning the existing curriculum. Also, students struggle with integrating their fragmented knowledge into whole diagnoses. Student team working using case studies is being tried to develop better synthesis skills. Two instructors said the revised curriculum would affect only 50% of students since the top 25% would learn in any environment, and the bottom 25% were unlikely to do better than minimal work in an ideal curriculum.

Analysis: The instructors' observations reflect the comments of employers: There are areas of veterinary practice that the curriculum does not cover well, and there are gaps in graduates' fundamental knowledge (system characteristics). An indication of organization rhetoric was the efforts by a few instructors to compensate for shortcomings in the curriculum through team teaching and create presentations and assignments that lead students to learn in different ways.

5. In which areas of the curriculum have you observed final year students to be least proficient? (Burton & Merrill, 1977, normative need; Rossett, 1987, actual result)

Findings: Two faculty stated that students have trouble integrating learned material into a complete diagnosis. Other comments noted that students were weak in (a) manual skills, (b) small animal medicine and surgery, and (c) applied physiology, neuroanatomy, clinical pharmacology, nutrition, pathophysiology, and the economics of practice.

Analysis: Employers and faculty concurred that recent graduates often have trouble synthesizing knowledge and observation into an accurate picture of animal health. Thus, the curriculum did not reflect employers' and instructors' expectations for diagnoses and synthesis (a system characteristic).

6. How do you feel about the proposed changes in curriculum? (Burton & Merrill, 1977, felt need; Rossett, 1987, feelings)

Findings: Five of the faculty felt that the proposed curriculum would be a positive change. Two were opposed to the plan; both believed the systems approach would fail to present students with a holistic view of an animal. One instructor stated he would use his academic freedom to resist the plan. Three instructors noted improvements like team teaching and intradepartmental integrated courses that had been made within the existing program. Both clinical and basic sciences faculty felt it would be hard to design interlocking courses using didactic material and requiring irregular blocks of instruction time.

Analysis: The concerns about topics integration, scheduling, and faculty cohesion are evidence of organization politics. Asking instructors to express their feelings toward a change in the work environment is an important step toward reaching buy-in of the needs assessment outcome.

7. What should CVM do differently to prepare students for work? (Burton & Merrill, 1977, future need; Rossett, 1987, solution)

Findings: The seven instructors said CVM should be doing more of the following (listed by respondent):

- A. Teach from an integrated curriculum with more hands-on training.
- B. Use a committee of clinicians and practitioners to define the curriculum objectives and content. Design the core of the curriculum to emphasize basic knowledge. Teach self-directed learning. Set grade standards at the upper half of the class. Reduce classroom hours on some courses. Correlate the curriculum elements with state and national board test items.
- C. Be less concerned with preparation for private practice and teach the broad knowledge suitable for all segments of the profession. Teach business management.
- D. Teach baseline knowledge but include the newest technology and medical techniques. Instill graduates with a need for continuing their education.
- E. Better organize and deliver information for quicker understanding. Captivate student interest through inquiry, hands-on learning, and action research. Discover our own curriculum and not borrow from another institution.
- F. Base the curriculum on the practicing veterinarian. Eliminate material that is not relevant to practice (as much as 60% of the basic sciences content) and hear arguments from instructors concerning what material ought to be added. Teach entry level knowledge on equine, food/fiber, and small animals to all students rather than tracking.
- G. There is little opportunity for thinking in the current curriculum; design the next one to emphasize problem-and team-based learning.

Analysis: Individuals' solutions reflect the workings of the organization system. The recommendations are reasonable (many are practiced in instructional design for industry), but the two sciences perceive different outcomes for the curriculum.

8. Do you look forward to the proposed curriculum changes? (Sleezer, 1992, buy-in)

Findings: The five basic sciences faculty said the proposed curriculum would make their teaching easier. Advocates of the new program said (a) students will better understand all the material, (b) faculty will have the opportunity to teach their expertise (some do not now), and (c) the blocks of time will reduce the pressure on faculty to get high marks from student evaluations. They also noted two concerns: Problem-based learning in the basic sciences may take longer, and coordinating the curriculum will be critical. Opponents argued that students will be at a disadvantage under the new curriculum; they will have more trouble comprehending the condition of the animal and adapting to "a parade of visiting instructors."

Analysis: This question made the organization's rhetoric plain. A majority of faculty indicated by vote that they were willing to accept the CDC's proposed curriculum.

9. What attitudes or values should become incorporated into the curriculum? (Rossett, 1987, optimal result)

Findings: Six faculty said values could not be taught effectively to adult students. One wished to see the College emphasize lifelong learning. Three of the faculty said ethics could be embedded in the curriculum by (a) asking instructors to act as exemplars, (b) admitting candidates who have demonstrated an understanding of ethical behavior, and (c) inviting private practitioners onto the campus to speak on ethical issues. Two instructors said they spoke of ethics only when a need arose in problem-based teaching.

Analysis: Faculty agreed that ethics are important in veterinary medicine; yet, they expected the admission process to relieve them of the task of proselytizing (a system expectation). That practice may not be a problem since employers, who were polled about values in the proficiency review, rated the College's graduates as being very good in exhibiting a work ethic and in observing ethical practices.

Additional Comments

"Every time there is a bump in the road someone may say, 'This thing won't work!' (a political characteristic), but we can't go back now (organization rhetoric)."

[In Bull and Montgomery's research within the College] "90% of the faculty showed the same [MBTI] type" (organization culture).

"There is a basic division between the basic and clinical sciences...few of us [in the basic sciences] interact with them (a system characteristic). Those guys say we don't prepare students" (organization culture).

"There are two groups of faculty: those with less [sic] than 10 years teaching experience and older faculty with older success methods (organization culture). Problem-based learning is hard for older faculty while professors [who use newer methods] are popular with students" (organization rhetoric).

"With our curriculum we are driven by the national board exams. Without memorizing minutiae, that often appear on board exams, students can't pass and can't practice" (a system characteristic).

Analysis: The interviews uncovered horizontal and vertical divisions among faculty. The vertical division characterized differences between the clinical and basic sciences groups. One aspect of that division was a sense of what knowledge was important for a veterinarian to have (what should be taught). The horizontal division characterized faculty on the length of one's teaching experience. The cultural, rhetorical, politics, and systemic characteristics were more evident in these interviews than were the political characteristics.

Culture. The College's culture is bound to teaching veterinary medicine for all segments of the profession even though most students will pursue private practice.

Rhetoric. Organization members anticipated changes in the curriculum (the teaching portion of the system), but there was no consensus on what changes needed to be made. None of the faculty interviewees or CDC members (other than the Chair) suggested a curriculum model to

replace the current program. Two instructors felt strongly enough about change to try team teaching across departments.

Politics. There were strong opinions among tenured faculty about the proposed changes. Some implied resistance to the new plan. This can be explained by the limited opportunity for advancement in the College, with greater opportunity for recognition through research and teaching. Clinical faculty and younger basic sciences faculty voiced expectations of a curriculum that would address graduates' stated weaknesses and permit them to teach new courses. All were aware that the Dean favored curriculum changes such as reducing credit hours and integrating theory and the clinics.

System. The existing curriculum views the DVM degree as matriculating through core courses with electives as fill material rather than as topics to focus skills and knowledge.

II. Administrative Faculty

The Dean gave the CDC the task of reviewing the present DVM program and suggesting changes that would streamline the curriculum to make learning easier and more relevant. These changes were in accord with recommendations from the American Veterinary Medical Association accreditation committee. Changes occurring at other veterinary schools facilitated the notion of reviewing the curriculum. The emphasis was satisfaction with the core DVM program; i.e., how well did the education meet graduates' needs in practice? Although clinicians routinely talk with customers, they discuss specific cases, not practitioner competency. Moreover, many instructors don't talk to customers at all, nor do they belong to practitioner organizations. Thus, there was a need for feedback about whether the curriculum was useful to practitioners.

The CDC's emphasis was how to use faculty resources and how to balance curriculum content between the basic and clinical sciences. To decide justly, the CDC needed documented information from the graduates—something never before done at the College. There had been no change in the curriculum since 1986 when species emphasis was added to the program, and no changes in faculty in the last five years. The Associate Dean said, "We want the needs assessment to reflect what graduates think of the program." He agreed to support the analyst in the needs assessment with access to faculty and the CDC and with printing and mailing the proficiency review.

Analysis

The analyst found that the College had publicly defined the organization's objectives in its literature but did not have a specific vocational goal for the DVM program. Although the CDC had struggled with the curriculum frame and course sequence, the outcome of the DVM curriculum had not been defined for the teaching faculty. While all faculty thought the curriculum should train graduates to pass their board examinations and be capable of animal medicine, many also thought it should prepare graduates to enter into any sector of the profession. The analyst thought this oversight would pursue the new curriculum through the implementation phase since the CDC could exhibit only referent power.

Note. Sources cited in the synopsis are included in the References chapter of the case study.

APPENDIX K
SYNOPSIS OF ORGANIZATION CULTURE

Synopsis of Organization Culture

Shapiro and Schall (1990) believed that insiders learn the rules of right conduct within an organization by observing behavior patterns of influential people. The authors' offer questions that can be used to understand organization behavior and clarify the organization's culture. The analyst conducted interviews among three administrative and teaching faculty to develop a fuller understanding of the College's culture and rhetoric. A correct understanding is important if statements about the salient characteristics of organization elements are to be used to explain the needs assessment outcome.

Whom is it necessary to influence in the College to accomplish personal and organization goals?

A representative of the basic sciences faculty said the Dean and the respective Department Head must favor one if he / she is to move up in his or her career. The clinical sciences faculty believed the Director of the Teaching Hospital and the Head of the department were the decision makers they had to impress. The structure of the organization permits the Dean and the Director of the Teaching Hospital control over opportunities for professional involvement, project priority, funding, and access to people and equipment. Project leadership can lead to recognition among peers and professionals. The department heads allocated opportunities according to instructors' work loads and the department head's appraisal of prior project completion(s). Department heads also submitted to the Dean the names of faculty whom they thought had earned pay increases and to a committee those who merited tenures.

Rules: One needs to please the boss and the boss' boss.

The approval of colleagues is helpful in attaining personal goals.

What appeal will influence those individuals favorably?

The Dean and the department heads responded to requests that met the College's goals, were workable, used available resources, and promoted the College among alumni and members of the profession. For institutional decisions, this meant projects. For personal advancement, successful appeals are based on continuing high performance.

Rule: There must be evidence of achievement that benefits the College for a request to be favored.

What personal style is most likely to influence those decision makers?

The common response was caring about one's work as it related to departmental goals. Other styles included assertiveness, openness, sincerity, and conservative judgement.

Rule: One influences colleagues by caring about the work that benefits everyone.

What channel is most likely to convey the message in a way that will be influential?

Administrators and faculty responded to direct, personal communication more often than by telephone, report, or electronic mail.

Rule: Use face-to-face meetings for important actions.

What did the last 10 people recognized by the organization have in common?

Faculty commended by the Dean had shown exceptional production in teaching, research, or outreach. There was no single characteristic. The Dean and the department heads recognized that each instructor typically excels at one thing. People who become known in the College strove to use their best talent to promote the College among students, practitioners, and the public.

Rule: To look good to management, do things that make the organization look good to outsiders.

What are some 'should' statements that circulate in the organization?

On the topic of the DVM curriculum: "It may be the role of education to see the future first." "Our current training is superficial." "We must modify the curriculum to eliminate the nonsense [students] do not need to know." "We should use a committee to define the core material." "We should teach students to teach themselves." "We should evaluate the curriculum on a course-by-course basis." Many of the comments expressed in the needs assessment survey comments were 'should' statements. For example, "what lacks in [the College's] program is to pull the faculty together as a team," and "Faculty must exhibit values among themselves."

Rule: Always be thinking of ways to improve the program for students.

What excuses or justifications are given for behavior?

The analyst observed the CDC secretary arrive late to one session. He offered his apology saying, "My laboratory class overlaps our meeting time." The Associate Dean told the analyst, "The AVMA accreditation committee has told us we have to reduce our contact hours," and "A five-year curriculum is not economically feasible; already, the cost of veterinary education exceeds the payback." An instructor told the analyst, "As a tenured professor I have academic freedom. The CDC cannot force me to teach something."

Rules: Teaching is the most important thing we do here.

We can't teach students everything we would like them to know.

Outside forces also determine what we must do.

Even rational programs must be 'sold' to the users.

What kinds of influence behaviors are applauded, condoned, or disdained based on circulating stories?

The Associate Dean related three criteria for recognition by administrators: quality teaching, competent research, and community service. The two teaching faculty told the analyst they applauded being productive, positive about assignments, and helpful with colleagues. The CDC Chair explained in a session that one department head was opposed to the proposed curriculum and might resist implementation if it was approved. The CDC members did not view such resistance as constructive.

Rule: Exemplary behaviors include productivity, competence, and stewardship

What is focused on, whose ideas are accepted or rejected, and who allies with whom in the organization?

The administration focused on alumni relation and student recruiting while the basic and clinical sciences focused on teaching and research. Not all faculty endorsed the Dean's ideas, but he had legitimate and reward power. An instructor's ideas were accepted (following approval from the appropriate department head) if the suggestion was beneficial to many, and if the individual was capable and responsible for its undertaking. The basic science departments often joined with one another due to the similar nature of their studies. The clinical sciences had more contact with practitioners than with the basic sciences faculty, so they sometimes allied with customers in establishing practices.

Rule: Focus your energy on the things that your department does best.

What is the moral of stories that circulate about influential people or events in the organization?

Some faculty with long teaching experience said the systems model of curriculum had been tried here and elsewhere without success. Their message was, this cannot work, and we do not want to be part of it. Other faculty expressed a different moral: "It's not perfect, but we are ready to try something different," and "If it doesn't work, we'll fix it and try again."

Rule: The College must discover its own best curriculum model.

What marks someone's passage from an outsider to an insider in the organization?

The transition came with the perception of the faculty that an individual was willing to take up the College's mission, be part of the team, treat coworkers as friends, and use the organizational system to satisfy personal goals. Acceptance was often conveyed among members by word of mouth.

Rule: Build a support base of colleagues who will facilitate your project and help with other opportunities.

How does the workplace look? What symbols influence others?

The basic sciences faculty were located in the oldest veterinary building on campus, but new classrooms and laboratories had been added and some older laboratories had been remodeled. The faculty had individual rooms as their offices. There was a kennel where pound dogs are kept until needed. The clinical sciences faculty were located in the teaching hospital, a newer building characterized by the presence of customers, large and small animals under treatment, and students in smocks or surgery "scrubs." Most clinical faculty had cubicles for their offices. About half the faculty kept their offices neat while the others had books, papers, journals, and teaching media stacked about the floor and on chairs, cabinets, and shelves. Some of the male faculty had stuffed game animals on their walls or desks. The most common artifact among all the faculty was animal cartoons taped to doors, desks, cabinets, and walls. Many faculty displayed their DVM certificate in their offices, and some displayed a terminal degree.

Rules: We practice animal care without putting animals on a pedestal.
Please excuse the mess, our duties keep us busy.

Synopsis

The responses from the three interviewees were very much alike in describing the rhetoric, behavior, and persons of influence in the College. The people to impress are the Dean, the Hospital Director, and one's department head. Achievers stand out by (a) furthering the College's goals through participation, (b) being proficient in their area of emphasis, and (c) helping colleagues with what they do. The rewards are primarily intrinsic: the esteem of one's peers and the satisfaction of being part of the profession's knowledge base. Extrinsic rewards are recognition, tenure, professional involvement, and salary increases. The best strategy for recognition is a recommendation of one's leadership or proficiency from an influential member. Humor, informality, and sincerity are key affective characteristics.

Note. Shapiro & Schall (1990), cited in the synopsis, is included in the References chapter of the case study.

APPENDIX L
COMPLETED PAT WORKSHEETS

Phase One: Organization Analysis

Determine where in the organization or work group the change emphasis should be placed.

Step One: Identify perceived needs

This step occurred during the initial interviews between the analyst and the client; it was part of the discovery process. Information gathered in this step varied because people at different places in the organization had different perceptions of the curriculum.

Identify the perceived needs and the individuals who view them as important.

Increased or renewed alumni support (a need perceived by the academic administrators).
 Recruitment of top level candidates to the College based on the quality of the curriculum (academic administrators).
 Decreased number of students who fail the board examination (academic administrators).
 Education extension courses that fit the needs of practitioners (extension administrators).
 Students can integrate, learn, and recall knowledge more effectively (all faculty).
 Document how recent graduates perform in private practice (faculty and administrators).

What is the product of the organization or work group?

One of the College's stated objectives was "to provide superior veterinary medical education opportunities which will prepare graduates for varied careers in this field." The College also provided extension courses on aspects of veterinary technology to veterinarians (from the College's 1995-1996 admissions information book).

Who is the client?

"Practicing veterinarians and other scientific workers" (ibid.). In the needs assessment, practitioners in the private sector were the clients. Practitioners consisted of the College's graduates from 1991 through 1995 and the private practice employers who had hired them.

Analyze the information that has been gathered up to this point.

The College's objective for the DVM degree does not emphasize training for private practice over that for public service or academic veterinary education. Although the College provides support to practitioners, it also seeks support from alumni. Each function group (administration, science faculty, medical faculty, diagnostic faculty) perceived needs differently, primarily in terms of its own responsibility.

Which needs are related to the organization's goals?

Alumni support, education extension, professional education, and recruitment, respectively.

How are the perceived needs related to the goals?

Alumni support in the forms of gifts or grants are necessary for the College's capital improvement and research activities. Hosting clinical and technology seminars provides

revenue that assists the College's operation. Quality education and recruitment enhance graduates' careers so they are more capable of supporting the College later in their lives.

Do the perceived needs seem to have a knowledge, skill, or attitude component that can be addressed with curriculum changes? (yes/no)

Yes. This item was meant to address problems in industry where training is an option. In education, where learning is the organization's product, the intervention choice is whether to update the curriculum or continue with the present one.

Analyze the information that has been gathered up to this point.

Revision of the curriculum would benefit students, faculty, and administrators the soonest. Employers of graduates will benefit in the long run. The cost of changing the curriculum appear to be minimal, since it does not require new facilities, and could eventually increase recognition for the College and the amount of financial gifts from corporations and alumni.

Phase One Step Two: Determine the Purpose and Parameters of the Analysis

Step Two (A) Use the following items to identify the salient characteristics of the organization, decision makers, analyst, and customer elements and record summary notes.

The Organization

Organization culture: the climate for curriculum change; history of curriculum change in the organization; organization philosophy, goals, objectives and values; amount of consensus or conflict in the organization; legal, social, economic, and political factors inside and outside the organization.

History. The anatomical systems approach to teaching veterinary medicine had been tried at the College in the 1940s and again in the 1970s without success. A new Dean and Associate Dean had been installed since the previous attempts. The last time the curriculum was formally reviewed was 1986 when 'tracking' (species emphasis) was added. There were no overall change to the curriculum since.

Philosophy. Many of the statements used by the basic sciences faculty (parasitology, microbiology, pathology, and physiology) reflected the essentialist philosophy; e.g., "the purpose is to instill a deeper understanding of animal medicine." The words of the clinical faculty (medicine and surgery) reflected pragmatism; e.g., "most of our graduates are private practitioners," and "no one should go through the system without looking at small and large animals."

Objectives. The College wished to provide (a) superior veterinary medical education opportunities; (b) a facility for maintaining animal health through medical, surgical, and diagnostic services; (c) a facility for research into animal diseases; and (d) continuing education about animal diseases for practitioners and scientists. (Stated in the 1996-97 admission booklet).

Values. Professionalism, integrity, ethics, compassion, learning, dedication, motivation, perseverance, and scientific curiosity. (From a 1992 internal CDC memorandum on values).

Consensus. Many of the faculty agreed that the curriculum needed to be changed to make the material timely, relevant, and lean. The faculty agreed that the growth of knowledge has made being knowledgeable in veterinary medicine difficult for students and instructors.

Conflict. Clinical and basic sciences faculty disagreed on the purpose of the DVM program and in its content. Divergent philosophies of education may have been the origin of the differences in curriculum. The basic sciences faculty practiced reflective, pedagogical, distributed learning methods while clinicians chiefly advocated an active, andragogical, mass learning style.

Economic. The College did not have enough funding to attempt a radical curriculum change, so the existing academic resources had to be accommodated. Recent renovation of some of the laboratories and building new classrooms made it possible to teach larger groups of students.

The reward structure

There were three extrinsic criteria which the Dean considered in assessing faculty performance for periodic merit raises: (a) a recommendation by an instructor's department head, (b) faculty peer evaluations, and (c) instructor evaluations completed by students. In addition to compensation, there was tenure determined by contribution to veterinary science and judged by a committee of faculty. Although there were opportunities for recognition in classroom instruction, there was little opportunity for advancement in the organization. Intrinsic rewards consisted of the satisfaction of working with fellow professionals.

Political factors surrounding the situation

The faculty groups had different tasks, and were located in three buildings. This produced 'camps' of thinking. Instructors-of-record tended to be recognized by faculty as subject matter experts. Some of the senior faculty exercised political influence over members within their department. This produced a constituency based on deference rather than merit.

The organization's external and internal environment

External. The market for private veterinary services had been nearing saturation according to some veterinary publications. In addition, the number of students applying for entrance had been increasing for the last three years; in prior years the number of applicants had been decreasing. A recent and controversial book by an administrator of a veterinary college argued that there should be fewer US veterinary schools, fewer students admitted, and much higher fees to limit growth in the field. The faculty reported that funding for research projects was becoming harder to secure. Finally, The American Veterinary Medical Association accreditation board urged the College to emphasize professional ethics and values in their curricula. The board also directed the College to reduce the number of course credits required for the DVM degree and to make it easier for students to take elective courses that focus knowledge on an animal species.

Internal. Planned improvements in classroom, laboratory, and computing facilities were finished in 1996. The next scheduled curriculum review by the AVMA accreditation board will occur in 1999. The Dean consolidated the three basic sciences departments into two shortly after the needs assessment concluded.

The broader program of which curriculum revision is an element

The DVM program existed to educate students for licensure as doctors of veterinary medicine. The College wished to increase satisfaction with its teaching, research, and services (continuing education diagnostics, and a teaching animal hospital) among students, graduates, employers, and the public. The College also sponsored topic seminars and state convocations to disburse knowledge and to foster relationships.

Supporting systems such as the selection, human factors, and work procedures

There had been no change in faculty in five years. The faculty were a mix of international, state, and regional specialists. All faculty were expected to teach and advise veterinary students. Many of the Ph.D. holding instructors also had DVM degrees. However, some faculty liked to point out that not all of the basic science instructors had DVM degrees.

and not all clinical instructors had Ph.D. degrees.

Terminology and language used in the organization

The language of the basic sciences was generalized, quantitative, and causal. That group's intent was individual accomplishment. Curriculum discussions typically covered the breadth of knowledge available to students. Often, unique maladies received more attention than did the common diseases. The language of the clinical sciences was pragmatic, qualitative, and focused on the comprehension of a limited amount of core material. Students worked in teams on individual animals. Curriculum discussions focused on being capable in the basic methodology and familiar with recent developments.

Other factors

According to French and Raven (in Sergiovanni, 1983), social power is used to win group or individual support for an agenda. The organization, administration and faculty, used expert and reward power, respectively, to achieve its goals. Faculty often spoke of ethical behavior as an important characteristic that students and graduates must demonstrate.

Analyze the information that has been gathered up to this point.

The faculty earnestly believed that their duty was (a) to prepare beginning veterinarians by imparting knowledge and skills to become competent practitioners and (b) to create lifelong learners. Although most students wanted their educations to emphasize techniques for service, the faculty who resisted curriculum change argued that the existing curriculum was meant to provide foundation knowledge for entering any segment of veterinary practice and for keeping up with future developments in animal medicine. Private practice was the career choice of 92% of the graduates, and clinical knowledge was expected by employers. Instructors reported that the large amount of theoretical knowledge required by the current curriculum (and the state and national board examinations) was often forgotten by students before the fourth year and not required in practice. This represented an inefficiency in the curriculum.

The Decision Makers

Expectations of the decision makers

The decision makers were the members of the Curriculum Development Committee (CDC). The CDC said documented information from the needs assessment showing weak areas of practice proficiency (based on the current curriculum) would be helpful in revising and justifying the curriculum. Making changes to the existing curriculum was expected to (and did) generate controversy within the faculty.

Amount of support for curriculum revision

The initiative for revising the curriculum and the deadline for its completion came from the Dean of the College. The Dean was moved by a directive from the AVMA accreditation board to reduce the number of credit hours in the DVM program and by a trend among North American veterinary colleges to update curricula for the needs of the new century. Two thirds of the faculty voted in favor of changing the curriculum, and several

confided to the analyst that they had tried (and mostly failed) to change their own part of the curriculum over the years.

Amount of consensus among decision makers

From the start, the analyst noted the CDC's collegiality toward carrying out its mission. He heard no internal dissent over revising the curriculum; no one questioned the need or purpose of the needs assessment. Further, no one questioned the validity of the survey and extant records findings even though some members taught courses in which graduates and employers reported weak proficiency. After several attempts to design an improved curriculum, the members agreed on a model to propose to the faculty. Although some faculty in the CDC members' respective departments were opposed to the changes, each member acted as part of a team when the Committee began the revision process.

Style and experience of the decision makers

The CDC was composed of two representatives from each of the former departments and one representative from administration. Four of the nine members had fewer than 10 years teaching experience. Two members held Ph.D. degrees, three held DVM degrees, and four held both. The two representatives from medicine and surgery were accustomed to problem-centered teaching, while the six basic science faculty preferred a didactic style. The preferred communication style was direct, face-to-face. The successful achievement style was described as assertive, competent, team-oriented, and considerate. The CDC, reporting to the Dean, had only referent power to employ in promoting the new curriculum.

Skill levels of the decision makers

Only the administrative member had evaluated a curriculum before this event; no one spoke of having designed a formal curriculum or conducted a needs assessment before this event. All decision makers seemed to be at the same level of capability in translating the needs assessment findings into information about the existing curriculum and in spotting potential problems in the proposed curriculum.

The level of the decision makers position in the organization

Four of the members were tenured professors, four were associate professors, and one was an assistant professor. The analyst did not observe any member attempting to influence another member's decision.

Other factors

The analyst realized while designing the performance criteria for the proficiency review instrument that there were differences in thinking between veterinary and business education. The decision makers seemed uncomfortable with words like customer, sales, profit, and performance. They preferred words like clientele, service, cost, and proficiency. The CDC members also felt they had no accurate method of translating an inventory of workplace tasks and skills into a curriculum. Thus, the existing curriculum became the baseline from which to measure graduates' proficiency in the needs assessment.

Humor was a major part of the needs assessment planning sessions but was observed less often in the curriculum revision sessions. The analyst thought the members did not feel they were risking their professional images in making jokes during the needs assessment meetings; however, they came to the curriculum revision meetings with sober intent. After the needs assessment was completed, the Chair invited the members to propose a curriculum model. No one did, so he submitted a curriculum model to get the revision process moving. Later, he said he came to the meeting with a model in mind to prevent the committee from wasting its purpose by fretting over details. The analyst did not think this was done to manipulate the other decision makers but to expedite the process.

Analyze the information gathered to this point

The Dean pushed for the new curriculum's early completion. The Administration and the CDC understood that certain changes had to come out of the curriculum revision. The CDC members were knowledgeable in their fields, but only one had been in private practice and none had formal knowledge of curriculum design. The analyst observed a high degree of collegiality and openness among the members.

The Analyst

Internal or external consultant

The analyst was external to the College.

Biases, attitudes, beliefs, and values

The analyst describes himself as pragmatic and inductive thinking with a concrete-active learning style. He promotes a sociotechnical approach to human resources development (HRD), and counts stewardship, lifelong learning, and synergy as important principles for high performance organizations.

Skill level

Journeyman level in HRD including needs assessment, organization development, instruction design, and program evaluation.

Type of power

The analyst typically employs a combination of salesmanship, negotiation, and expert power in building consensus. He often uses division of labor in getting tasks done.

Style and experience of the analyst

The analyst was employed fifteen years in industry and manufacturing as product manager and field engineer. He is accustomed to using the four-step discrepancy model for needs assessment and successive approximation for problem solving. His communication style is direct, and his conflict resolution style is cooperative.

Analyze the information gathered to this point

The analyst has the skill to investigate the College's curriculum needs and suggest changes based on expressed needs and available resources. He believes, however, that needs assessment outcomes will be effective only if the organization's decision makers and members together develop a solution appropriate for their culture.

The Customer

Who is the client and what is the goal? What is the nature and degree of agreement or dissent among customer groups?

There were two client populations in this study, (a) the graduates of the College's DVM program from 1991 through 1995 who were employed in private practice, and (b) private practitioners who had employed at least one of the graduates. The goal was to survey some of both types of customers to answer the question, how well prepared are the College's graduates to practice veterinary medicine? The proficiency appraisal findings showed that employers most often rated graduates as being 'adequate' to 'very good' while graduates most often rated their skills as 'very good.' Both groups did agree on some areas of practice where graduates' abilities were strong or weak.

What do customers see as the valued outcome or benefit, and how do they define quality? What measures will they use to determine if the benefit is met?

Graduates' comments indicated they viewed their DVM education as (a) preparation for passing the board examinations and (b) training for their career. Comments from employers indicated that most expected graduates to be capable of contributing to the practice's earnings straight away. Both groups perceived the DVM program to have value if the rewards exceed the costs to them individually. Employers described a quality veterinary associate as conscientious, enthusiastic, practical, and a team worker. Graduates said practicality, self-discipline, and consciousness were important values in a peer veterinarian.

What are the professed and actual needs of the customer? How are the needs linked to performance or accountability?

The expressed needs of the customer (from the surveys) were abilities like surgical skills, medical knowledge, business management, and the ability to deal with customers and staff. According to most faculty and administrators, the actual need of the graduate is to receive a core education which will allow him or her to pursue a career in any of the veterinary segments. The actual need of employers is to hire graduates with sufficient biological knowledge and clinical skills to contribute to the practice while continuing to learn on the job.

The needs were exhibited in practice through perceptions of customer satisfaction. The merits of the DVM program can be linked to performance by (a) evaluating a graduate's data gathering, analysis, and decision making abilities in unique situations, (b) measuring the graduate's time on task for routine medical processes, and (c) assessing the graduate's interest in continuing education.

Who are the performers, and do they have the skills, knowledge, and motivation to do what is needed? What do customers expect the performer to do differently?

The organization's primary performers were the graduates. The proficiency review and the faculty interviews showed graduates have the knowledge and skills to begin fulfilling the actual needs of employers in the private sector (after graduation and licensure). Most were motivated to fulfill the felt needs of their employers as well. The other group of performers was the College's faculty. The instructors had the knowledge and skills to conduct a curriculum that was oriented toward preparing graduates to work in veterinary medicine. Two-thirds of the faculty were eager to see the curriculum redesigned. The new program needed leaders within the faculty who were willing to promote and support it.

Customers reported they wanted the curriculum to (a) integrate the basic and clinical sciences so learning is not fragmented, (b) teach knowledge that is relevant to daily practice, (c) omit material that is redundant or irrelevant, (d) include more hands-on experience in medicine and surgery, (e) provide more elective courses for species emphasis, and (d) expose them to business and management processes.

Is there alignment between the customer's goals and the organization's goals? What inside or outside forces threaten collaboration?

Since a majority of employers (and graduates) rated graduates' proficiency as adequate or very good, there was a large degree of alignment between the College's products and customers' needs. But the alignment was not total; employers wanted clinicians who could advance their businesses as associates while the College prepared graduates to work in public, industrial, and academic sectors of the profession. Payment of education loans made it difficult for graduates to save enough to purchase an interest in their employer's practice. Moreover, the market for animal care may become so competitive as to block most new graduates from entering into private practice. By the end of the century the College may emphasize education aimed at corporate employment.

Other factors

Customers possessed reward power through their ability to employ graduates and to donate research or capital improvement monies to the College.

Analyze the information gathered to this point

The characteristics of practitioners taken from the extant records and supplied by some faculty supported the characteristics derived from comments in the proficiency assessment instrument. The culture of the customer's workplace was like that of a small business: cost sensitive, service oriented, and competitive. Their operating systems were routine by intent, and the language did not advocate change. As proprietors, power and politics follow the owner's wishes. The extant records tell something that was not measured by the surveys; two-thirds of the employers were described as highly capable clinicians. Their assessment of graduates' skills and knowledge is probably more accurate than graduates' self-appraisal of skills.

Sergiovanni, T. (1983). Supervision: Human perspectives. New York: McGraw Hill.

Phase One Step Two: Determine the Purpose and Parameters of the Analysis

Step Two (B) Using the information from Step One and Step Two (A), determine the purpose and parameters of the performance appraisal.

Specify the purpose of the needs assessment, the kinds of information to be gathered, the resources available to conduct the analysis, the boundaries of the needs assessment, the type, the format and recipients of the report, and the criteria that will be used to evaluate the performance appraisal, the proposed solution, and the product.

The needs assessment was performed to learn about graduates' knowledge and skills relative to the existing curriculum. The information needed for the assessment was (a) graduates' self-appraisals of clinical proficiency, (b) employers' appraisal of graduates' proficiency, and (c) evidence of graduates' self-assessment and work characteristics. The resources for the study were the 1991 through 1995 graduation roll, 1992 through 1996 AVMA member directories, students' preceptorship reports, the assistance of the CDC and other faculty, and the support of the Dean of the College. The subjects were the College's graduates and their employers. Graduates had to have been employed from 1991 through 1995 with one or more years work experience in private practice. Employers must have supervised at least one graduate from the study period. Selection was made from the 1991 through 1995 classes with approximately equal emphasis on class, gender, animal focus, and location. The needs assessment would terminate with the action plan for a new curriculum.

The products of the needs assessment were a presentation of findings and a written report. A computer slide presentation of the data was shown to the CDC on April 23, 1996. Although not all the expected data had been received, the presentation indicated strengths and weaknesses of the existing curriculum. A final written report, *A Stakeholder Need Assessment in Veterinary Medicine*, was given to the Dean, Associate Dean, and CDC on July 1, 1996. The Associate Dean provided the department heads with copies of the report. The CDC distributed the needs assessment findings (and the curriculum proposal) via local area network. The analyst asked the CDC to appraise the needs assessment using a special worksheet. Four of the evaluation criteria were the research questions stated in the analyst's research proposal.

Do the decision makers and the analyst agree about the purpose and parameters of the performance analysis? (Strategies can be used to negotiate this agreement, but do not proceed with the needs assessment until there is agreement.)

Yes. The Assistant Dean (a decision maker) and the analyst discussed the purpose and bounds of the needs assessment in the first interview. The Assistant Dean said the College would assist the analyst in developing and distributing a proficiency survey, contacting instructors, and working with the CDC.

Is the agreement appropriate based on the organization's salient characteristics?

Yes. The Assistant Dean and the CDC Chair both said the needs assessment was necessary and timely, for no study had ever been done in the College to measure the effectiveness of the DVM curriculum. The Dean of the College originally wanted the CDC to propose a revised curriculum by June 1, 1996. In May, the Dean approved the Chair's request for a longer completion period, the end of the Fall semester.

Phase One Step Three: Gather Information About Potential Training Opportunities

On the worksheet below indicate the actions taken and record summary notes about the results.

Begin the process at the most general level and proceed to the most specific.

The analyst heard of the College's need to perform a curriculum outcome review from one of the faculty. The analyst called upon the Associate Dean to learn more about the problem and its importance to the College. The analyst proposed doing a needs assessment to learn the outcome of graduates' veterinary education and to find out what graduates, employers, and faculty thought the curriculum ought to be like. He also interviewed the Head of Surgery, the Associate Dean, and the Director of Preceptorships to get the history of the problem and discover the degree of support for its investigation. Next, the analyst began meeting with the decision makers (the CDC) to design a study that would address their needs for documenting the strengths and weaknesses of the existing curriculum. The CDC were predisposed to make some changes to the curriculum to meet accreditation requirements, but they wanted to retain the good features of the current program and to fix the problem areas.

Use multiple sources and information gathering methods.

The needs assessment used surveys and records analysis to measure the clinical proficiency of the College's graduates and ask them what they thought of the curriculum. Extant records and employer surveys were used to verify graduates' self-assessments. Interviews and observations were used to gather information about the characteristics of the organization, decision makers, and customers. That information was not important to the curriculum revision but was instrumental in addressing the research questions.

Gather both quantitative and qualitative information

The survey information was a mixture of quantitative (the tabulation of 47 proficiency ratings from 230 responses) and qualitative (the transcription of practitioners' suggestions, complaints, and praises for the DVM program) data. The observations, interviews, and extant records were qualitative data focused on the culture and rhetoric of the College.

Examine current and future proficiency expectations

The surveys were not designed to address future proficiency nor represent optimal criteria. Respondents' comments indicated graduates and employers were concerned only with current proficiency. Employers indicated that graduates should be capable in common surgical methods, knowledgeable of medication and dosage for common infirmities (in a species), ethical in practice, collegial with staff and clients, and have some business acumen. Some of the extant records expressed students' future expectations, like working in a progressive practice, owning one's own clinic, or becoming an authority (e.g., "the best reptile surgeon in the state"). Observations of the CDC and interviews with the faculty revealed a broad mission for the DVM program: to prepare graduates to work in the corporate, academic, government, or private sectors of veterinary medicine. Their intent for the future was not defined; two administrators and two faculty believed future graduates who would learn and practice in one species domain.

Examine current proficiency

The needs assessment defined a major customer segment and got first data on their appraisal of the curriculum. The needs assessment report explained in detail the proficiency of the College's graduates. The findings showed more 'very good' ratings than 'poor' ratings. Graduates most often rated their abilities as very good while employers rated the abilities as adequate. Graduates divided their proficiency ratings between 'very good' and 'adequate;' both levels were higher than 'weak' ratings (VG = 22, A = 23, W = 2). Employers perceived new graduates as 'adequate' in most competencies (VG 6, A = 37, W = 4). Graduates rated themselves 'very good' in professional and work ethics, continuing education, clinical examinations. Employers assessed graduates as 'very good' in professional and work ethics, continuing education, applying published information, applying published information, and clinical examinations. The deficiencies mentioned most often by graduates were accessing electronic information, exposure to business management, diagnostic testing, and pharmacology. The deficits most often cited by employers included knowledge of business practices, informing clients, common surgical methods, writing skills, diagnostic testing and pharmacology.

Identify measures of proficiency

An outcome assessment had never been made upon the DVM curriculum, and evaluation criteria had not been established. The surveys used the existing curriculum as a basis for assessing proficiency. There were no concrete standards for proficiency; instead, graduates' and employers' perceptions were used. The faculty were more comfortable appraising students (using observations, test results, and classroom interactions) since they had little word or contact with the graduates. The criteria of the extant records were the individual proficiency factors and the work environment factors suggested by Gilbert (1978) on the Extant Data Worksheet.

Gather information about possible causes and potential solutions

The needs assessment was a descriptive study, so causation was not a research objective. However, a few faculty gave opinions: Graduates' proficiency may be weak in some areas because as students they typically do not read much of the required text materials or learn the underlying science, but memorize answers. Students say they do this because (a) the volume of detailed material is too great to cover in the allotted time, (b) students get through the admissions screening process with weak knowledge of the biological sciences, and (c) the required clinical rotations (years three and four) reduce study time. Graduates' survey comments expressed the view that clinical deficiencies were due to insufficient hands-on experience, weak medical knowledge was due to material in the curriculum unrelated to daily practice, and decision making deficiencies resulted from too little exposure and business knowledge.

The faculty interviewees offered no curriculum model to replace what was being done presently. But one instructor suggested using a focus group of clinicians and employers to define the fundamental tasks and valued outcomes from the DVM program. Another suggested paring the curriculum to its most basic elements then asking faculty to debate as a means of restoring other, favored content. Graduates' solutions were focused on specific problems they had encountered; e.g., allow students to do more surgery, teach the medicine of

daily practice, and raise admission standards.

Gather information about potential trainees

Students came from all backgrounds. Fifty-five percent of the graduates in the study period were male, but that figure declining each year at the College. About 90% of graduates take jobs in private practice, and 45% remain within the state where the College is located. Three faculty commented that 25% of any group of students will learn easily and another 25% will struggle no matter what the curriculum is like.

Identify those who support and those who do not support the curriculum revision

According to the Associate Dean, 63% of the faculty voted to support the proposed curriculum. Several of the faculty interviewees said they were voting for a change in the curriculum, not because they liked the suggested model. Most of those in favor of change had fewer than ten years teaching experience at the College. No attempt was made to identify those not supporting the proposal, but those who expressed disapproval to the analyst stated that the systems approach to teaching (part of the proposed curriculum) (a) made reflective learning difficult, (b) had twice been tried at the College, and (c) would not accommodate their research and outreach obligations.

Identify the subject matter experts

The customers, especially the employers, were the experts on the knowledge and skills necessary for daily commercial practice. The faculty were the experts in special areas of science and clinical medicine. A few of the instructors had experience in private practice before coming to academia, and the Associate Dean had published on the subject of veterinary education revision.

Use the "Solution Finder" (Swanson & Sisson, 1985) to identify potential training and management solutions.

The step was not needed in this study. The CDC were charged with the responsibility of revising the DVM curriculum. After completing the needs assessment, the analyst was an observer of the curriculum revision process.

Renegotiate the purpose and parameters of the analysis if necessary.

That was not necessary. The need assessment was proceeding along the steps of the PAT model.

Note. Gilbert, T. (1978), cited in the worksheet, is included in the References chapter of the case study.

Phase One Step Four: Gather Anecdotal Information

Gather and record examples of anecdotes, vocabulary, and examples of positive or negative experiences that can be used for instruction or to describe the curricular needs. Record the sources and the contexts.

A graduating senior interviewed with 32 practitioners in 1992. She reported to the Curriculum Development Committee that each of the employers was critical of the quality of students they had seen. She raised the question, How well does the curriculum train students to practice? The Committee chairman replied that he was not aware of any problems with the curriculum, and he permitted no further discussion of its worthiness. [Associate Dean, interview]

A graduate reported on her proficiency instrument that she performed a Caesarian delivery on a cow while reading the procedure from a book. She said she had three large animal rotations in the College's DVM program, but did not get that training. On the other hand, two graduates expressed gratitude at length for the quality of small animal veterinary education they received. [graduates, proficiency review comments]

A graduate sent a sample to a pathology instructor asking for help with analysis, because his employer did not have laboratory facilities. The instructor related how the employer called later to complain of the postal cost, saying it was hurting his business. The instructor noted, "It was only \$2.75 postage each way, and I didn't even charge him for my time!" [CDC member, needs assessment design session]

In her preceptorship report, one student told about a host who practiced economic utilization at length. The practice reused hypodermic needles until they would no longer stay affixed to the syringe, refilled intravenous drip bags, and reused other disposable supplies like tongue depressors. The owner frequently admonished her to use minimal bandage. [fourth year student, extant records analysis]

An equine clinician had a student who was doing poorly in large animal medicine and cared nothing about horses. He begged the instructor to give him a passing grade, saying he was going into the military upon graduation and would practice only canine medicine. The graduate's first assignment was at a base where there were 100 horses. The clinician said, "He was calling me three times a week for help. I had to teach him by phone all the things he didn't learn when he was here." [clinical faculty, interview]

Purdue University wanted to help practitioners by offering a short course on practice management. The five-day course was to be taught by Purdue's business department and cost \$750. Although pamphlets were mailed to 1000 Indiana practitioners, not enough people signed up to conduct the course. Apparently, practitioners would not close their clinics for one week to learn more about business methods. [Associate Dean, CDC meeting]

A practitioner wrote that the first of the College's graduates he had hired left the firm "after six months breaking in" and went to work for "the ungrateful doctors" at a competing clinic. The practitioner said he would never again hire a graduate from the College. [employer, proficiency review]

The analyst wanted to measure graduates' marketing strength in the proficiency review, but a CDC member objected to proficiency in "sales" as a performance criterium saying, "Veterinarians deliver services...we do not have sales." The analyst realized that different disciplines interpret words in different ways. [a needs assessment design session]

I've seen a lot of veterinarians go out of business, but none because they practiced medicine badly. I tell students to hire a CPA to manage their future business. You don't want the CPA to work on animals, so don't you try to run the business One graduate does her own contract negotiation; of course, she had a MBA before she became a vet I asked a young woman what she was going to do after graduation. She said she was going back to her daddy's ranch in Texas and open a half-day clinic. I told her she couldn't do all that by herself. A year later she was back here trying to hire another vet as full-time help. [Director of Preceptorships, interview]

The Associate Dean told a group of faculty the most recent big issue among practitioners is what they call "the Wal-Mart mentality." Private veterinarians are angry that consumers call and shop for the lowest cost in pet care. The Associate Dean reviewed a book published in December, 1996 by an administrator at a US veterinary college. The author advocated limiting the number of veterinary schools, limiting enrollment, and doubling tuition to discourage applicants and limit the number of practicing professionals. [presentation to the College]

Some preceptorship reports illustrated autocratic and supportive preceptors. One preceptee chose a well-known equine clinic for her externship. On arrival, she found the practice in turmoil. "Three years ago, they were on television for their neonatal ICU work. The owners would not allow their associates to buy into the practice, now there are three competing clinics in the area." A second student wrote that she was not allowed to talk with clients in her externship because "they belong to the doctor." Another reported, "At this clinic, interns treat preceptees like flunkies." But some students were impressed by their hosts. One student reported "The doctor [there] will address you as 'Doctor' and introduce you to clients as a doctor." A host told another extern, "The preceptorship is for you to learn, not to help me with my practice." There were more good comments than discouraging ones; for example, "seeing, doing, and being lectured while working was a very effective way of learning for me," and "a lot of the lab tests are more meaningful to me now that I have performed them as part of the whole process of assessing an animal." [graduates as students, extant records]

Analyze the information which has been gathered to this point

The anecdotes describe the traditional work culture of veterinarians. Most private clinics are proprietorships or partnerships. As small businesses they may exhibit parochial attitudes toward costs, work, labor, and competition. Many practitioners will need to contract the services of professional managers to handle the increasing presence of government regulations, consumer expectations, personnel turnover, and price competition as well as strategic and financial planning (the analyst's bias). New graduates of a different gender mix, entering the field in larger numbers, will create changes in the culture of the profession, and on-line information systems will change diagnoses and treatments. Thus, future curricula may not resemble the needs discovered in this needs assessment.

Phase One Step Five: Analyze Information

On the worksheet below indicate the actions taken and record summary notes about the results.

Verify the data analysis with those who provided the input, if possible

The seven teaching faculty read the transcripts of their individual interviews and returned transcripts after making corrections and clarifications to the text and signing approval. The changes were minor. The Director of Preceptorships read and verified the analyst's synopsis of the extant records. The Associate Dean read and verified two synopses, the observations of the CDC sessions and the organization's culture. Both verifications indicated the analyst had perceived the data in the same manner as the reviewers.

Determine the causes of proficiency issues

Causation is not part of a needs assessment by the definition used in this study. Practitioners and instructors volunteered their opinions about graduates' proficiency. The comments of practitioners suggested students could use more exposure to basic surgery, common medicine, and business management. Two clinical instructors told the analyst that the program should permit more small animal surgery and pharmacology. Both employers and instructors said (a) students have trouble integrating pieces of knowledge into a diagnosis and (b) studies preliminary to veterinary medicine should be more rigorous.

Identify curriculum needs and other issues

The curricular needs are (a) fewer classroom hours, (b) integrated theory and clinical studies, (c) relevance of course materials, (d) course sequencing, (e) preparation for board examinations, (f) preparation for professional employment, (g) increased exposure to management methods, (h) increased clinical methods and pharmacology, more electives in the third and fourth years, (i) training in ultrasound imaging, and (j) exposure to diagnostic software. The topics discovered in the findings not related to curriculum revision were (a) work ethics and values, (b) manual aptitude (surgery), (c) continuing education, (d) education debt, (e) admissions reduction (class size), and (f) on-the-job training.

Determine some alternative solutions

Developing a solution to College's curriculum problem was the prerogative of the CDC and was not part of the needs assessment design.

Determine the criteria for selecting a solution

The solution must be acceptable to employers faculty, students, and administrators (the organization elements). The following criteria were raised at different times during the CDC sessions: The new curriculum should (in some cases it must) (a) meet the AVMA accreditation requirements, (b) fit within the College's budget, (c) address students' learning and participation needs, (d) prepare graduates for which ever segment of the profession they choose to enter, (e) order many of the courses logically, (f) cultivate ethical practices, (g) produce capable veterinarians, (h) further the goals of the College among alumni and the profession, (i) be workable, and (j) not conflict with faculty obligations toward research or extension. Not all these criteria could be met, and some conflicted with others. The CDC did

not define criteria for the selection or evaluation of the curriculum.

Prioritize the potential need responses

The issues were selected by members through discussion. The importance of some issues vacillated throughout the program, but the final ranking was:

1. Reduce the program's required credit hours
2. Integrate the biological and clinical sciences as much as possible
3. Make the new curriculum operable and sustainable
4. Permit elective courses in the third year and add species emphasis courses to the fourth year
5. Help students to learn and instructors to transmit knowledge
6. Prepare veterinarians who combine quality animal care with ethical practice
7. Utilize the College's existing human and capital resources to the fullest degree

Forecast the financial benefits of options relative to the organization's goals

The CDC was not asked to estimate the financial benefit of revising the DVM curriculum.

Renegotiate the purpose and parameters of the analysis if necessary

This action was not necessary.

Phase One Step Six: Report the Findings to the Decision Makers

On the worksheet below indicate the actions taken and record summary notes about the results.

Explain why the Performance Analysis for Training was undertaken.

A needs assessment was appropriate for determining how well the DVM program had prepared graduates for private practice. PAT was used as a tested structure to carry out the needs assessment in a higher education environment. The College had not done a product evaluation in its history, and evidence of program strengths and weaknesses was desired for revising the core curriculum.

Describe how the information was gathered.

Four data gathering methods were used to characterize the organization elements: observations to characterize the CDC (decision makers), interviews to characterize instructors and administrative faculty (organization members) and to understand the organization culture, surveys to determine customers' (graduates and employers) proficiency and hear their needs, and extant records to triangulate with the practitioner data. Purposive sampling was used to select the information sources.

Identify the stated need(s).

A needs assessment would provide the CDC with self-rated proficiency descriptions documenting the existing curriculum's strengths and weaknesses. This information was important to initiate and sustain a revised curriculum. Additionally, two clinical faculty expressed concern that economic conditions might lead some graduates to practice outside their area of species emphasis. Data on the frequency of such a crossover occurring would help promote a curriculum for generalized training rather than species tracks.

State the findings of the Performance Analysis for Training

The results of the needs assessment were described in Step Three as 'current performance.' Those results suggested that the existing curriculum was adequate in preparing students, but could be strengthened in certain areas and could be arranged to make learning easier. Feedback from graduates about the College, faculty, and courses was enlightening; one instructor commented that he / she planned to adjust his/her instruction in response.

Additional investigations were made to better understand the organization and to fill out the PAT worksheets. The outcome of the observations was insight into the group decision making process in the College. The instructor interviews exposed divisions in teaching among the faculty and showed the need for a defined outcome (goal statement) for the DVM program. The study of organization culture clarified the incentive system in a unit of higher education and enlightened the analyst upon how achieving faculty both move ahead and maintain positive relations with peers. These additional findings gave the analyst insight into needs assessment and ideas for improving the PAT model.

Identify the curriculum revision and other solutions.

The CDC reached agreement by combining the best aspects of two of the options. The proposed curriculum used the anatomical systems approach from another institution but modified the curriculum frame to accommodate many of the student and practitioner suggestions. The curriculum integrated surgery, medicine, and pathology; reduced the credit hours of basic sciences disciplines and required their consolidation; added electives to the third and fourth year plans of study; and focused instruction on mixed species. Thus, the AVMA mandate was met, nonessential material was excluded, and the work load for students was perceived to be reduced. Although not all the selection criteria could be met, this negotiated solution satisfied the faculty (based on the voting results). Customers' needs other than curricular ones were not part of the CDC's mission.

Identify the most appropriate curriculum solution.

The analyst thought of possible ways to go about revising the curriculum:

1. The CDC could modify existing courses to reduce credit hours and consolidate content. This is the simplest way to meet the AVMA requirements and some practitioners' wants.
2. The CDC could adopt a successful curriculum frame from another veterinary college of similar size. This was expected to address common problems with a moderate amount of success.
3. The CDC could employ focus groups or Delphi studies to envision veterinary medicine 10 years in the future and design a curriculum to prepare graduates for such work. This plan would be risk-filled and the most difficult to design and execute.
4. The CDC could define the veterinary market(s) it will educate graduates to fill. A clinical instructor suggested using a focus group of clinicians and practitioners to define what the veterinarian would be expected to know and do. The group also would develop an inventory of knowledge and skills. The CDC would use these findings and information about board test criteria to design a new curriculum. This Instructional System Development (ISD model) approach would focus the curriculum on the outcome of the licensure and practice. The analyst believed this would be the best curriculum solution because ISD is often used to design vocational education instruction that meets employers' needs. The ISD approach would have taken about one year longer to complete.

Specify the forecast costs and benefits of the solution(s).

The benefit of modifying the existing curriculum was timeliness, ease, and a better chance of being accepted by the faculty. The CDC thought the existing faculty was sufficient in number for the new design. Only the futurist solution would require capital expenditures by the College. The benefit of the ISD approach would be that employers (in whatever segment of the profession was selected) could hire graduates who more closely fit their needs than graduates from competing schools.

Specify the significance of the findings so the client's 'so what' question is answered.

The majority of customers indicated by comment and that they were satisfied with the College's "product." However, the data indicated that some knowledge areas were weak and could be improved (e.g., knowledge of treating common diseases, surgery techniques, pharmacology, and practice management). This feedback from customers provided administrators and faculty with information about how the College was doing. The CDC felt justified in recommending changes to the existing curriculum that would address some customers' concerns.

Perform action planning with the client.

The CDC Chair and the analyst agreed that it was important to get the needs assessment findings to the faculty. The Chair suggested using the College's local area network to distribute the findings and the curriculum proposal. The CDC also allowed the analyst to observe the sessions in which the Committee developed the new curriculum (the analyst attended but did not participate). The CDC's action plan was in five parts: First, they constructed a four-year curriculum frame that would satisfy AVMA requirements and address the most serious needs raised by customers and students (to the extent that a solution would be acceptable to a majority of faculty). Second, they presented an initial written proposal to the Dean and faculty. Third, they explained the concept verbally to small, mixed groups of faculty. Fourth, they amended the proposal to address concerns expressed by the faculty which the Committee thought were valid (scheduling and prerequisites). Finally, they put the finished proposal before the faculty for the vote. The task of developing course content from the curriculum frame was the responsibility of the departments.

Phase One Step Seven: Decision Makers Acknowledge, Prioritize, and Determine the Training Needs

The decision makers identify the specific performance needs for which curriculum resources should be allocated:

The CDC had two opportunities to acknowledge curricular needs, the needs assessment conducted by the analyst and the student interviews conducted by the CDC members. The analyst made the CDC aware of the findings of the needs assessment through a presentation of the data and a report given to the Chair (and to College administrators). Briefly, more than 95% of responding graduates and employers said the College's recent graduates were proficient in using their core knowledge, and more than 92% of each group said graduates were proficient in clinical reasoning. Overall, graduates appreciated their educations and were confident of their abilities. Employers voted graduates to be very good in professional ethics, parasitology, and clinical examinations. In their comments on how to strengthen the DVM program, employers voted heavily for deepening the medical and surgical practices, teaching business management, and human relations skills. Graduates also wanted more medical and surgical practice and business practice. They also felt that admissions should be tightened and the curriculum made more relevant to actual practice.

The CDC interviewed students currently in the DVM program and discovered four needs: (a) integration of theory and clinical studies should be tried, (b) more opportunities for species emphasis should be available, (c) there should be more elective courses earlier in the program, and (d) better sequencing of the core courses ought to be done.

The Chair drafted a memorandum on July 24, 1996 that defined the goals the CDC had set for the new DVM curriculum. Specifically, the proposed curriculum must (a) reduce program credit hours to no more than 19 each semester, (b) provide opportunities for second and third year students to take elective courses and fourth year students to emphasize a species of their choosing, (c) provide exposure to live animals during the first two years of the program, (d) sequence courses in a logical order of study, and (e) integrate courses that share common material into one course. The intent of the committee was to overhaul the existing program rather than design a new curriculum. There were three contributing factors. First, an imposed time limit favored revising the curriculum rather than developing a new one using the available data. Second, there was opposition from some faculty to moderate change, so a wholly new curriculum probably would not have been accepted. Third, the proficiency ratings (apart from the comments) indicated the existing curriculum was adequate.

The CDC worked on the curriculum through the summer and submitted a tentative plan to the faculty in September. The proposed curriculum reduced credit hours in the first three years from 121 to 111 with no semester requiring more than 19. The number of credits assigned to disciplines were reduced because (a) the courses contain only core material, (b) some classes have been changed into prerequisite courses, and (c) some courses will be combined in the systems process. These changes met the needs of the AVMA accreditation panel, students, and many of the alumni.

Each CDC member was asked to meet with a small group of instructors from across departments and hear their questions. Some instructors were concerned that their courses had been combined with other courses. No instructors would lose their jobs, and the instructors-of-record would teach the subjects they knew as modules in an integrated curriculum.

Clinicians were concerned that the teaching blocks would interfere with their rounds. Some basic sciences faculty felt that the fast-paced stream of topics, long parade of different instructors, and lack of repetitive knowledge would be difficult for students to accommodate. Several young faculty said any curriculum change would be better than the current one.

In October, 1996 the faculty voted on the proposal. Sixty-three percent favored it. The Dean, who had veto power, felt the vote represented sufficient support to proceed with the proposed curriculum. The remaining work, designing the courses for each of the eleven anatomical systems, was the responsibility of the departments. They will have until the Fall semester of 1998 to develop integrated courses. Some of the clinical faculty told the analyst that none of the needs assessment findings had been incorporated into new curriculum. In fact, some of practitioners' suggestions had been accomplished: integrating subjects, eliminating redundant material, increasing electives, earlier clinical exposure, and reducing anatomy courses. Providing more business management knowledge and 'hands on' clinical experience in common infirmities were not addressed in the revision.

The execution of PAT in a higher education setting had been completed with the decision makers participating in the needs assessment. The needs assessment report recognized and prioritized practitioners' expressed needs, and some important ones had been addressed in the new curriculum.

Other findings from the needs assessment

The analyst gained new knowledge about the PAT model. First, although designed to discriminate between training and nontraining solutions to needs, PAT can be used to investigate a wide variety of organization problems because it does not specify any one method of investigation or analysis. Second, there are external parties other than customers who can influence needs: government agencies, vendors, and political action groups. Third, the negotiation process and the extensive amount of inquiry make PAT better suited to complex organizational problems or affective personnel behaviors. Time or personnel constraints could make a smaller needs assessment model more appropriate. Fourth, since PAT does not specify an outcome, small changes in the data gathering and analysis sequence can be accommodated. Fifth, logistical aspects of data gathering make PAT a recursive needs determination model rather than a linear one.

The study turned up some caveats about needs assessment in general. First, a leader among the decision makers must endorse the need solution and continuously 'sell' it to organization members. Second, ownership of findings is a powerful motivator, so decision makers should be active in gathering information about needs. Third, differences in word use can prevent needs from being understood by those who must take action on them. Fourth, the needs assessment should include an action plan that specifies who shall be obligated to take the action. Finally, customers or organization members who have made their needs known should be notified by the decision makers of the actions resulting from the assessment.

APPENDIX M

EVALUATION RESULTS

Part 1—Comments from the CDC Evaluation

Worksheets

Part 2—Comments from the Independent

Reviewer

Comments from the CDC Evaluation Worksheets

Four written comments were received from the CDC appraisal of the needs assessment:

“Needs assessment is very useful for the clinical aspects of the veterinary curriculum. Practitioners may not always be the best to judge how basic sciences fit with a complete veterinary curriculum. The needs assessment allowed the committee involved in curricular investigation to focus on those ideas most relevant to the clinical services in veterinary medicine. I also think it opens a door between the College of Veterinary Medicine at [University] and its alumni.”

“The needs assessment was a valuable tool. The results of the assessment was a surprise to me in allowing us to see how many things we are actually doing right. The results of the assessment was used in shaping the curriculum. I believe of great value are the written comments from employers and graduates along with the numbers. The results are of value to me as an instructor looking at what practitioners perceived their knowledge to be (or not be) in my discipline. I plan changes in my course to enhance their ability to learn pertinent information. The admissions committee should also review the assessment as a valuable tool. Many of the desirable qualities are those that cannot be taught, and we must select students that already have such qualities. We must stress the importance of those qualities throughout the student’s tenure in our program.”

“In many respects, the needs assessment satisfied a political requirement that the practitioner stakeholder be included in the process of curricular reform.”

“This should be done again for the classes of 1996-1998 to see if the results agree. Those classes will be on the same curriculum as the classes '91 to '95. This should be done again in 2001 for the 1999-2000 classes to see if things have improved, stayed the same, or deteriorated.”

Comments from the Expert Reviewer

“Here are some comments related to the use of the model. I will try to respond to the specific questions that you asked of me as the external reviewer. In a sense, however, you must take these comments with a grain of salt because I have a long history of working with the College in the study, and that may, to some extent, bias my opinions. [May 5, 1997]

“1. The model as modified seems to do a good job eliciting the information needed to delineate the strengths and deficiencies of the curriculum. The problem, as it always seems to be, is whose strengths and deficiencies are we going to accept as having priority.

“2. From my perspective, the customer’s perspective is very important. The learners, or customers, are one of the most important stakeholders in the learning process. The others being the faculty and the employers. The problem, as always, is in balancing the perceived needs of the learners with the desires of the employers and the beliefs of the faculty based on what was done to them when they were in school.

“3. Reading the data, I am less sanguine than you. I think that the student and employer needs have not yet been fully addressed by the faculty on the CDC, and in five years there will still be the same kinds of problems. This may be my history with these learners, but the faculty do not seem to be too responsive to students, and they seem to disregard the things that they don’t want to hear. There is only moderate agreement between the various faculty, the administration, and the decision makers. Given the proposed changes, I would predict that the customers and the employers would not believe that the curriculum changes had not gone far enough, although the two groups might not mutually agree on what was needed in addition.

“4. If the outcomes of the needs assessment are the proposed changes in the curricular offering, then the characteristics of the organization and the decision makers are clearly the most important. If the question means that what they said is influenced by who they were, then all were influenced. My response to the question takes the latter view.

“5. Clearly, the decision makers were involved in many parts of the process.

“6. The PAT seems to be an effective model as it elicits responses to the problems that are germane. All of the stakeholders are involved, and there are multiple ways in which data is solicited. The assessment is an iterative rather than a cross sectional process, and this is good. It is a thorough process and should get at all of the needed information.

“7. My major concern relates to the point at which the process stopped. If the second and third levels of the model could have been implemented, that is if we could have had an iteration of the data and seen some result, I would feel more comfortable. As it is, I worry that the problems discovered [by the needs assessment] will not be corrected because of the way in which the curriculum revision, as proposed, will be implemented. Clearly, the addition of the customer has improved the model for this and similar applications. An interesting study to follow on this, when it has been used in several setting, will be how the data from customers is accepted. In business applications, where there is a direct translation to ‘the bottom line,’ this is in many times difficult. In education settings, where the bottom line is less focused, this is even more focused.”

Note. The numbered responses refer to items on the Expert Appraisal Evaluation Worksheet.

APPENDIX N
INSTITUTIONAL REVIEW BOARD APPROVAL

**OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD
HUMAN SUBJECTS REVIEW**

Date: 03-01-96

IRB#: ED-96-083

Proposal Title: ADAPTING PERFORMANCE ANALYSIS FOR TRAINING
TO VETERINARY EDUCATION

Principal Investigator(s): Catherine Sleezer, Kenneth W. Knorr

Reviewed and Processed as: Modification

Approval Status Recommended by Reviewer(s): Approved

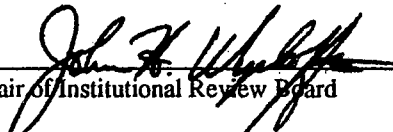
ALL APPROVALS MAY BE SUBJECT TO REVIEW BY FULL INSTITUTIONAL REVIEW BOARD
AT NEXT MEETING, AS WELL AS ARE SUBJECT TO MONITORING AT ANY TIME DURING
THE APPROVAL PERIOD.

APPROVAL STATUS PERIOD VALID FOR ONE CALENDAR YEAR AFTER WHICH A
CONTINUATION OR RENEWAL REQUEST IS REQUIRED TO BE SUBMITTED FOR BOARD
APPROVAL.

ANY MODIFICATIONS TO APPROVED PROJECT MUST ALSO BE SUBMITTED FOR
APPROVAL.

Comments, Modifications/Conditions for Approval or Reasons for Deferral or Disapproval
are as follows:

Signature:


Chair of Institutional Review Board

Date: October 28, 1996

cc: Kenneth W. Knorr

2

VITA

Kenneth Walter Knorr

Candidate for the Degree of

Doctor of Education

Thesis: ADAPTING PERFORMANCE ANALYSIS FOR TRAINING TO
VETERINARY EDUCATION

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